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EDITORIALS

MAN LABORS—NATURE WORKS

ONE of the desired and desirable aims and perhaps achievements of the New Deal is a shortening of the daytime of labor and a corresponding increase in leisure. There will be more time and there *should* be more time, for us *all,* to do the things we want to do and have always hoped to do—some sweet tomorrow. There should be more time for rest. Sleep alone is not the sovereign solvent for our woes; rest—a rightful, royal rest, and a real change from whatever order or disorder that now routinely fills our day—that should be our sane objective.

"There *should* be more time for rest!"
"There *should* be more time for play!"

And this is not the first time that this has been said.

Spring mornings have said it ever since the First Sheriff sent the shivering sinners from their paradise in Eden to a sunless subterranean cave.

The birds said it, and every blade of grass that bends with jeweled dew at dawn of day.

And the wind, soft on your face in the morning, and bearing burgeoned balm from every wood and thicket, said it.

The lounging stream that sometime finds the sea and the trout that dallies in the eddies said it.

All nature recommends a rest—Nature herself never labors—she works—and in her work is rest. But man, the wisest of Nature's children, is the weariest and dreariest too. His social structures call for toil—incessant toil and very little real rest. Such rest as he frequently gets is muscular rest which benefits only his body, when rest of mind and rest of nerve are more to be desired.

Hail the day when a wise government of man shall so arrange things that the preacher and the teacher, the doctor and the druggist, the plowman and the peddler, the millhand and his master, and every living adult human shall all find work to do and all find peace in what they do, and with it—rest.

IVOR GRIFFITH.

TIME-TRIED MEDICINES—The antiquity of some medicines used today is shown by the dates of their origin.

Black Draught (Compound Infusion of Senna) was originated about 1600 by an Italian physician, Mannogetta.

Blaud's Pills—Proposed by Dr. I. Blaud in 1831.

Citrine Ointment (Mercuric Nitrate)—First noted in the Edinburgh Pharmacpœia about 1722.

Cold Cream—Attributed to Galen, around 150 A. D.

Diachylon Plaster (Lead Plaster).

The formula was originated by a physician of the Cæsars, Tiberius Claudius Menecrates.

Dover's Powder (Powder of Opium and Ipecac) was originated by Dr. Thomas Dover, born in 1660.

Fowler's Solution of Arsenic—Published by Dr. Thomas Fowler in 1786.

Gregory's Powder (Comp. Powder of Rhubarb) was frequently used by Dr. James Gregory, who died in 1822.

Hiera Picra was sold in Rome and Alexandria 2000 years ago and is still in the National Formulary as Powder of Aloes and Canella.

Paregoric—Originated by Le Mont at the University of Leyden in 1702.

Plummer's Pills (Pills of Antimony)—The formula published by Dr. Plummer in 1751.

Laudanum—By Paracelsus, early part of sixteenth century.

POPULAR SCIENCE LECTURES

IN 1921 the Philadelphia College of Pharmacy and Science inaugurated a series of Popular Science Lectures, delivered in the evening, once a week, during the winter months.

So great was the success of the venture that these lectures have been given regularly ever since, and each series has been printed subsequently in a bound volume. Eleven such volumes have appeared to date, totaling nearly three thousand pages.

Most of the volumes are paper bound and have been sold at practically the cost of publication, being considered as part of the contribution of the College to the dissemination of a correct knowledge of scientific subjects. They have found their way into college and high school libraries as well as into many public libraries.

The attendance at the lectures have been most gratifying, the audience representing not only lay persons, but many professional men and women and teachers in public institutions as well as students who are interested in science. The lectures are given by members of the Faculty of the College and each year cover a broad and interesting field of scientific topics. The presentation of the lectures combines scientific accuracy, completeness and a minimum use of technical terms. Where possible, they are illustrated with specimens, experiments and lantern demonstrations.

This season again the College offers this popular course, and a glance over the prospectus (see page 46) suggests that the series will be chock full of interest and instruction.

Read these pithy paragraphs from the prospectus, and then write to the Registrar of the College for a copy, which will be mailed anywhere and without charge.

"We have learned to eat grapefruit, drink sauerkraut juice, avoid halitosis and B. O., and listen to and read the greatest amount of advertising hokum that has ever been inflicted upon a long-suffering world.

"This lecture will be concerned with the fads, fallacies, fakes and fancies of a large number of unrelated yet interesting subjects pertinent to the main title, Fads and Frauds in Foods and Drugs."

. . . . . .

"'Obesity,' like 'life,' is said to begin at forty; also, like 'life,' it consists largely of a state of mind as well as the actual physical condition.

"Whether or not we are obese is a matter of relativity, and sometimes depend upon the viewpoints and ideals of others, for in many of the marts of the world tonnage is a prerequisite of beauty."

. . . . . .

"And thus, in the long ago, the sea surrounded us—whereas in this, our present day, we surround the sea within us—the flowing, ebbing sea of blood whose cells and salts sustain our every living moment.

"For the plasma of our busy blood is salty as the sea, and death would come and quickly come, except that this, the simplest of salts keeps Life intrigued awhile.

"The cycle of salt from the quick to the dead and back to the quick again is a romance in itself—to say nothing of the role of other salts of the sea in Life's eternal shifts.

"Experiments will be conducted with salt—and paradoxically enough they will be experiments which will not have to be taken *cum grano salis!*"

. . . . . .

"Color has no existence in the bodies about us. As soon as the realm of color stimuli is extended beyond its usual limits, surprising effects of the most unexpected kinds may be produced. If 'seeing is believing,' the audience will be convinced by the lecture table demonstrations that colors 'are such stuff as dreams are made of.'"

. . . . . .

And so we might continue in merry quotation.

But a better plan by far is attendance upon the lectures.

IVOR GRIFFITH.

Schedule of Popular Science Lectures for 1935

Philadelphia College of Pharmacy and Science. All lectures begin at 8:30 P. M.

Wednesday, February 20th—"Fads and Frauds in Foods and Drugs," by Charles H. LaWall, D.Sc.

Wednesday, February 27th—"The Age of the Machine," by George Rosengarten, Ph.D.

Wednesday, March 6th—"Out of the Trash Can," by Freeman P. Stroup, Ph.M.

Wednesday, March 13th—"The Drugs of the Bible," by John E. Kramer, Ph.G.

Wednesday, March 20th—"Shooting for Recreation and Self Protection," by William J. Stoneback, M.Sc.

Wednesday, March 27th—"The Age of Obesity," by Joseph W. E. Harrisson, P.D., Ph.M.

Wednesday, April 3d—"Sea-Inside! The Story of Sea Water—Where Life Began, Where Life Will End," by Ivor Griffith, D.Sc., Ph.M.

Wednesday, April 10th—"Building Castles of Health," by Louis Gershenfeld, B.Sc., Ph.M.

Wednesday, April 17th—"The Incredibility of Color," by D. W. Horn, Ph.D.

ORIGINAL ARTICLES

EVALUATION OF ALOE*

By Dr. Arno Viehoever

Associate Referee, Philadelphia College of Pharmacy and Science

ALOE represents the dried resinous sap from the leaves of various tropical species. It is one of the old, well-known cathartics, stimulating the peristaltic muscles in the food canal. The purgative effect was already known to the Egyptians 2000 to 3000 B. C. The old Greeks and Romans also used aloe as a medicine. Chemically, it belongs to the anthraquinone drugs, together with cascara, frangula, rhubarb, rumex and senna. The evaluation of these cathartic drugs has been mainly one of identification—botanical (when possible), chemical, and, to a limited extent, physiological. In the case of commercial aloe the identification by botanical means is, of course, out of the question. The status of the chemical and physiological methods of evaluation, their applicability for different aloes and their constituents will be discussed below.

I. Historical—Chemical Composition and Physiological Action

The chemical composition is by no means fully understood. An attempt is made in Tables 1-3 to bring together the data reported for the various species of aloe. The data in literature are conflicting, the nature and amount of constituents vary, as may be expected from our general knowledge of changes in chemical composition in the sap of plants at various seasons, of growth in different localities and when collected from different varieties and species. No doubt, changes also occur during the processes of collection and of drying the concentrated sap. Even on the mere standing of the aqueous solutions, changes occur, made obvious by the development of a red coloration, and becoming more intense on standing and exposure to the atmosphere. According to some authors (Oswald as an example) the oxyanthraquinones are the active constituents of the anthraquinone-cathartic drugs. Physiological data obtained by H. Vieth (1) with various anthraquinone derivatives are given in Table 4. It is an accepted fact that

*Presented before the Drug Section of the Association of Official Agricultural Chemists, Washington, D. C. The experimental work was carried out with the assistance of Charles S. Skerrett, Jr. The Board of Trustees of the *U. S. Pharmacopœia* supported the studies with a grant.

TABLE I

COMPOSITION OF ALOE SPECIES

	Curacao: A. vulg. Lam. var. chin. Back	Barbados: A vulg. Lam. var. barbad. Mill. A. vera L.	Cape: A. Ferox L. Mill.	Socotra: A. Perryi Back	Natal: A. Barberae Dyer
Aloin	10-16 per cent.	Up to 25 per cent.	Very variable: up to 20 per cent. (Feroxaloin) Barbaloin	7.5-10 per cent.	
Barbaloin } Isobarbaloin }	10-16 per cent. 10-30 per cent. (Goudswaard)	Up to 25 per cent. Barbaloin 0.5 per cent. Isobarbaloin	No Isobarbaloin	Mainly Barbaloin Little Isobarbaloin	
Nataloin					ca. 14 per cent. Nataloin $C_{23}H_{24}O_{10}$
Homonataloin					no homo Nataloin (?) $C_{22}H_{22}O_{10}$
Emodin	0.8 per cent. (Cristofoletti)	0.15 per cent. (Pedersen) 1.0 per cent. (Cristofoletti)	Up to 0.5 per cent. (Cristofoletti)		
Resin	86-88 per cent. Ester of Cinnamic Acid of Resitannol	Ester of Cinnamic Acid of Aloe—Resitannol, 12.6 per cent. Amorph. H_2O sol. 62.7 per cent.	66-68 per cent. (Kiefer) In average 40 per cent. (Wehmer) Ester of Paracoumaric Acid of Aloe Resitannol (Tschirch-Pedersen) 19 per cent. (Tschirch) 56 and 82 per cent. (Van Itallie) 32.5 and 59.5 per cent. (Kosmann)	"Aloetin"	Esters of Paracoumaric Acid of Aloe Resitannol Nataloin red.
Ethereal Oil	0.1 per cent.	Traces—Characteristic odor	Trace		
Organic Acids	Cinnamic Acid p-Coumaric Acid Possibly traces of Salycilic Acid Fatty Acid (some m.p. 75-78 per cent.)	Cinnamic Acid			
Glucocides	Anthraglucoside	Emodinglucosides of d-Arabinose	Hydrolysis products: Aloeresinatannol, Sugar		Anthraquinone Tetraoxymonmethylester = d-Arabinose
Foreign Substance		Ash: 1.75 per cent.	H_2O, Protein, Salts } ca. 8 per cent.	Tannin	
H_2O	Abt. 10 per cent.	10 per cent.	7 per cent.		

TABLE 2

LITERATURE TO CHEMICAL COMPOSITION OF CURACAO ALOE, ALOE VULGARIS, LAM.

Aloe Vulgaris Lam.	Curacao-Aloe	Aloin	Emodin	Resin	Ethereal Oil	Organic Acids	Glucoside
Var. chinensis barb. (Aloe Chinensis) Treumann, Beitraege z. Kenntiss der Aloe. Dissertat. Dorpat 1880 Groenewald, *Arch. Pharm.* **228**, 115, 1890, Dissertat. Marburg, 1889 Van Itallie, *Pharm. Weekbl* **40**, 1033, 1903, **42**, 533, 1905 Goudswaard, *Pharm. Weekbl.* **61**, 302, 1923	(West Indian Aloe)	10-16 per cent. Barbaloin Isobarbaloin Flueckiger, *Arch. Pharm.* **149**, 11, 1872 *Pharmacognosy*, 211, 1891 Tilden, *Pharm. J.*, Trans., **8**, 231, 1877 Léger, *J. Pharm. Chim.* **15**, 519, 1902 Groenewold Tschirch, *Ber. Pharm. Ges.* **8**, 174, 1898	Aschan, *Arch. d. Pharm.* **241**, 340, 1903 Tschirch and Hoffbauer, *Arch. d. Pharm.* **243**, 399, 1905. (Emodin, split product of Anthraglucoside) 0.8 per cent. Tschirch and Cristofoletti *Schweiz. Wochenschrift* 456, 1904 Split product of Aloin Goudswaard	Little soluble in water Cinnamic Acid of Oleoresinotannol Goudswaard Van der Wielen, 1902, more than 30 per cent. Van Itallie, 1902, 27 per cent. Van Itallie, 1905, 13.6 per cent. Van Itallie, 11.4 per cent.—21.7 per cent. Tschirch and Hoffbauer, 1905, 33.4 per cent. Kraemer, 1920, 40-60 per cent.	0.1 per cent. Tutin and Naunton, *Pharm. Jour.* 91, 836, 1913	Cinnamic Acid p-couramic Acid Possibly traces of Salicylic Acid, Fatty Acid (some) —m.p. 75--78° C. Tutin and Naunton, 1913	Tutin and Naunton, *Pharm. J.* **91**, 836, 1913; 1157, 1914

TABLE 3

LITERATURE TO CHEMICAL COMPOSITION OF CAPE ALOE, ALOE FEROX, L. MILL.

Aloe Ferox (L) Mill.	Aloe Cape	Aloin	Emodin	Resin	Ethereal Oil	Organic Acid	Glucoside	Foreign Substance	Water	Aloetin
Léger, 1902, *J. Pharm. et Chim.* **15**, 159 Tschirch and Aschan, *Arch. d. Pharm.* **141**, 340-357, 1903 Tschirch and Hoffbauer, *Schweiz. Wochenschrift* **153**, 1905 Tschirch and Cristofoletti, *Schweiz. Wochenschrift*, 1909 Tschirch and Pedersen, *Arch. d. Pharm.* **236**, 200, 1898		(Barbaloin Feroxaloin) Aloin very different up to 20 per cent. aloin Léger, Aschan, Cristofoletti, Hoffbauer	Small amount Aschan 0.5 per cent. or less Cristofoletti	40 per cent. in average Paracoumaric Ester of Aloeresitannol: 19 per cent. (Tschirch) 56 per cent. 82 per cent. (Van Itallie) 32.5 per cent. 59.5 per cent. (Kosmann)	Trace Smith *Pharm. J.* 10, 613, 1880	Paracoumaric (Pedersen) No Paracoumaric Acid No Cinnamic Acid No Ester (Aschan)	Resin split in Aloeresitannol,sugar (Aschan)	Ash: 21 per cent. average 8 per cent. Foreign substance, H_2O, Protein, Salt Wehmer, Pflanzenstoffe 148, 1929	7 per cent.	Seel, *Arch. d. Pharm.* **257**, 212 1919
Kiefer, Dissertat. 1925, Basel		Little active 5 per cent.	1.5-1.8 per cent. Little active	66-68 per cent. I (1) Na_2CO_3 Sol. resin strongly active. 6-8 per cent. II (2) Possibly identical. Each cc. 30 per cent. Strongly active				(a) H_2O readily soluble substance, inactive 15-20 per cent. (b) Dark colored amorphous substance without laxative effect, effect, causing causing partly abdominal pain. 5-10 per cent.		

these anthraquinones occur both in the free state as well as in a glucosidic form, from which they may be obtained through hydrolysis—in the food canal or the chemical test tube. Aloin thus yields oxymethylanthraquinones; and chrysophanic acid is obtained through hydrolysis.

TABLE 4

CATHARTIC ACTION OF OXYANTHRAQUINONES TO CATS *

Constitution of Anthraquinone	Product	Degree of Effect			
		Inactive	Slight action	Active	Very active
		mgm.	mgm.	mgm.	mgm.
1, 2-dioxy	Alizarin	500	—	—	—
1, 3-dioxy	Xanthopurpurin	300	—	600	—
1, 4-dioxy	Chinizarin	1000	—	—	—
1, 8-dioxy-3-methyl	Chrysophanic Acid	—	500	—	—
1, 2, 3-trioxy	Anthragallol	100	—	300	1000
1, 2, 4-trioxy	Purpurin	1000	—	2000	—
1, 2, 6-trioxy	Flavopurpurin	100	—	200	500
1, 2, 7-trioxy	Anthrapurpurin	30	50	100	300
1, 6, 8-trioxy-3-methyl	Emodin	100	—	200	—
1, 2, 3, 4-tetraoxy	Alizarin Bourdeaux	500	—	1000	—
Pentaoxy	Cyanin	1000	—	—	—
Hexaoxy	Rufigallic Acid	1000	—	—	—

* This table, compiled by Munch (2), is based upon the data by Vieth.

II. Qualitative Chemical Evaluation

The chemical tests have been mainly simple tests using distinctive colors and shake-out methods differentiating the various anthraquinone drugs and indeed differentiating certain constituents formed in various species. These tests at best are only indicative of the presence or absence of certain drugs or drug constituents, before and after hydrolysis—and for adequate evaluation must be supplemented by methods for quantitative evaluation.

The requirements of various Pharmacopœias, with exception of the Swiss and Mexican Pharmacopœias, discussed below, are limited to tests of identity and purity, omitting altogether tests for chemical and physiological evaluation.

TABLE 5

PHARMACOPŒIAL REQUIREMENTS

Pharmacopœia	Edition	Year	Aloe Species, Origin, Name	Maximum Requirements		Extracts		
				Water	Ash	Water Extracts	Ether	Aloin Official
				%	%	%	%	%
American	10	1926	Aloe Perryi B. Succotrin Aloe vera L. Curacao Aloe ferox M. Cape	10	4	min. 50		+
Belgian	4	1930	Aloe various Aloe ferox M. Cape			max. 60		
British		1932	Aloe various Cape Curacao Socotrin Zanzibar	10	5			+
French		1908	Aloe various Aloe Africana M. Aloe ferox M. Aloe linguaeformis D. C. Aloe perfoliata L. Aloe spicata Th.		1.5	min. 40		
German	6	1926	Aloe various, Africa Aloe ferox M. Cape		1.5		1	
Greek	2	1924	Aloe ferox M.		1.5	min. 50		
Holland	5	1926	Aloe vera L. Curacao	12	2	min. 62		
Hugarian	3	1909	Aloe ferox			min. 60		
Italian	5	1929	Aloe various Aloe succotrina L. Aloe ferox M. Aloe Africana M. Aloe plicatilis M.	12	2	min. 60		
Japanese	4	1921	Aloe various, Africa		1.5	min. 60		
Mexican	5	1925	Aloe Africana M. Aloe ferox M. Aloe spicata Th. Aloe Barbadensis M. Mexico	12	3			7.5-10 (Socot.) +, 18-25
Norwegian	4	1913	Aloe various Aloe ferox M. Cape Aloe Africana			min. 50		
Russian	6	1910	Aloe various (3)		5			
Spanish	8	1930	Aloe various Aloe vera Will. Aloe ferox L. Aloe spicata Th. Aloe arborescens Will. Aloe linguaeformis L. Aloe vulgaris Lam.	10-12	2		3	+
Swedish	10	1925	Aloe various, South American Aloe ferox M.		1.5	min. 50	1	
Swiss	5	1933	Aloe ferox M. Cape	12	1.5	Chloroform-Methylalcohol min. 80		

III. Quantitative Chemical Evaluation

Among the first workers who attempted a quantitative evaluation of aloe was Kondracki (3). He emphasized the following ten factors as valuable in judging the quality of aloe.

1. The amount of moisture and of ash, as indicating the age (?) and the degree of care taken during preparation.
2. The amount of foreign constituents like resins and the like in the drug by means of benzin and chloroform.
3. The greater solubility of inferior samples in ether as compared with that of the better ones.

4.-6. The amount of substances, soluble in alcohol and methyl alcohol, permitting a judgment of the purity of aloe and of the important constituents as aloin, aloe-bitter and oleoresin.

7. The amount of oleoresin, insoluble in water, but soluble in alcohol.
8. The amount of aloe-bitter, soluble in larger quantities of water.
9. The amount of aloins, precipitated from aloe-bitter, and of non-precipitated inactive oxyaloin.
10. The amount of the active substance, precipitated by tannic acid and the amount of not precipitated aloins.

Tilden (4) based his method of evaluation on the amount of aloin, isolated from aloe by means of boiling water containing hydrochloric acid, decantation from the resin and concentrated to a small volume. Plenge (5) followed his procedure and the Mexican Pharmacopœia, as we shall discuss later, adopted Tilden's method, modified by Schaefer.

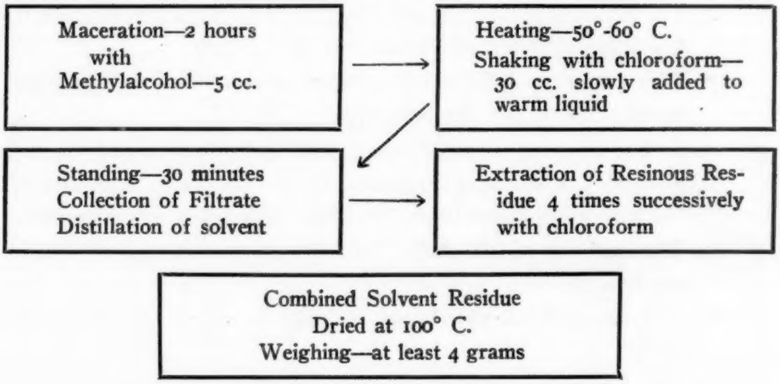
Tschirch and Hiepe (6) based their method upon the determination of the oxymethyl anthraquinone (aloe-emodin), examining the alkaline solution in definite concentration by means of spectral analysis —showing a very characteristic absorption band. However, this method did not permit the determination of other constituents, considered important, as aloin and anthraglucosides.

Tschirch and Hoffbauer (7), concluding that only the resin in aloe is totally inactive, or without purging properties, while aloin, aloe-emodin and anthra-glucosides have a purging effect, based their

method upon the quantitative precipitation and separation of the resin. In the elimination of resin they followed in a measure Kondracki's procedure, adopted and modified by Léger (8).

ALOE

5 grams



This method, assuring the presence of not less than 80 per cent. non-resinous constituents, was adopted by the Pharmacopœia Helvetica, fourth edition, 1907. Such requirements were only met by samples of Cape Aloe, containing "the largest amount of active constituents," according to their survey:

TABLE 6

Cape Aloe, semi-soft, 86.8 per cent. "Active Constituents"—Chloroform-Methylalcohol residue.

Cape Aloe, dry, 81.2 per cent. "Active Constituents"—Chloroform-Methylalcohol residue.

Cape Aloe (Uganda), 80.4 per cent. "Active Constituents"—Chloroform-Methylalcohol residue.

Barbados Aloe, new method, 72.4 per cent. "Active Constituents"—Chloroform-Methylalcohol residue.

Barbados Aloe, old method, 62.8 per cent. "Active Constituents"—Chloroform-Methylalcohol residue.

Curacao Aloe, 66.6 per cent. Active Constituents"—Chloroform-Methylalcohol residue.

Socotra Aloe, 36.6 per cent. "Active Constituents"—Chloroform-Methylalcohol residue.

From this tabulation, states Tschirch, it is obvious that the Pharmacopœias that have selected Cape Aloe have done well, as it contains the least amount of inactive resin. "The most smeary Cape Aloe yielded the highest percentage."

The presence of "Good Aloe" was further verified by test for (1) cape aloin, (2) aloe-emodin, (3) isoaloin—differentiation from Barbadoes aloes, (4) absence of nataloin, (5) anthraquinone reaction, (6) quantitative determination of the "active constituents—aloin," aloe-emodin and the anthraglucosides.

Van Itallie (9) found: (1) that some aloes did not give uniform results, (2) that the resin, precipitated by chloroform, may occlude constituents chloroform soluble, and thus cause lower results; (3) that separation between resin and non-resin constituents was not always possible; (4) that the amount of constituents soluble is increased in the presence of methyl alcohol, present in the chloroform distillates, which should therefore not be used in the extractions. With a slightly modified method, precipitating the non-soluble resin from a homogenous liquid of the aloe powder in methyl alcohol (heated to 60°), with chloroform (slowly added, and shaken for five minutes, then cooled), and repeating this operation three times, he obtained a non-sticky, powder-like residue.

TABLE 7

Cape Aloe, 82 per cent. Mean of 2 determinations.
Cape Aloe, 56.2 per cent. Mean of 2 determinations.
Curacao Aloe, 86.4 per cent. Mean of 2 determinations.
Curacao Aloe, 88.6 per cent. Mean of 2 determinations.
Curacao Aloe, 78.3 per cent. Mean of 2 determinations.
Aruba Aloe, 61.04 per cent. Mean of 2 determinations.

Thus Cape Aloe was found to contain more than 20 per cent. of resin and Curacao less than 12 per cent. On the basis of resin content, there is therefore no cause to consider Curacao Aloe inferior to Cape Aloe. "Pharmacological experiments (not reported in detail) revealed that Curacao Aloe is not inferior to Cape Aloe."

Eder and Schneiter (10) further modified the precipitation method, using a much smaller amount of aloe and simplifying the procedure:

ALOE POWDER

1 Gram

Heating in Reflux Apparatus
with
Methylalcohol—5 cc.

→

Addition of Chloroform—
30 cc. to boiling liquid
Standing overnight

Solvent Filtered—Distilled
Residue Dried—Dry air—100° 1 hour
Weighing—at least .8 gm. yield

This method was essentially adopted by the Swiss Pharmacopœia, fifth edition, 1933, with the requirement for at least 80 per cent. non-resins.

The residues, mostly light yellow, represented impure aloin, which could be obtained upon recrystallization from alcohol or chloroform-methyl alcohol in abundant crystals. As aloin was considered the most important constituent, its amount was determined in the residue by means of the Shoutelen reaction, representing the fluorescence caused by the solution of aloin in concentrated borax solution, the degree of fluorescence varying with the concentration of aloin.

A solution of 1 : 250,000, the borderline, where fluorescence still could be observed, was considered as the normal solution and used for checks. The amounts of aloin, reported in Table 8, were thus found. Van Itallie (9), while verifying in general Tschirch and Hoffbauer's results with the fluorescence method of determining aloin, pointed out the inherent difficulty of the method, due to the varying optical sensitivity of individual observers. He adopted the procedure of the phenol determination, forming a bromine compound of aloin (previously suggested by Dragendorff) (11), and measured the amount by titration. While very satisfactory results were obtained for pure aloin, the method was not applicable to aloe, as constituents, other than aloin, also responded, causing too high results.

In order to determine the nature of substances and their amount, present with aloin in the chloroform-methyl alcohol residue, Tschirch and Hoffbauer (7) heated (oxidized) aloe with concentrated nitric acid. The anthraquinone derivatives were thus transformed into chrysaminic acid, while the resin portion of aloe did not yield this acid. Their results obtained for various aloes are reported on table.

TABLE 8

Aloe	Aloin (Tschirch Meth.)	Other Substances yielding Chrysaminic Acid	Substances Soluble in Chloroform Methylalcohol not yielding Chrysaminic Acid	Resin
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Cape, soft	20	55	11.8	13.2
Cape, dry	16	59	6.2	18-18.8
Cape, dry				43.8
Cape, Uganda	16	34	30.4	19.6
Barbados	18	32	22.4	27.6
Barbados	16	34	12.8	37.2
Curacao	18	32	16.6	33.4
Curacao, (Van Itallie)				11.4-21.7
Curacao, Cape-like (Van der Wielen)	16.4			over 30
Aruba (Van Itallie)				38.96
Socotra	8	25	3.6	63.4

The Mexican Pharmacopœia (1925) adopted the old acid precipitation method for the determination of aloin, modified by Schaefer (12).

ALOE

50 grams

Solution in warm water—300 cc. Acidulated with HCl—3 drops	→	Separation from resin—After cooling To liquid add NH_3 (20 per cent.) and $CaCl_2$ (15 gm.) in H_2O (30 cc.)
Shake for 10 minutes Separate Aloin-Lime—(Water Freed)	→	Add slight excess of HCl, Mix Dissolve in warm H_2O, Filter Collect Aloin on cooling

Thus determined, the aloin content, according to the Pharmacopœia of Mexico, varies from 7.5 to 10 per cent. in Socotrin, from 18 to 25 per cent. in Barbados aloe. J. P. Snyder, in this country—in co-operation with the U. S. Revision Committee—recommends the following detailed procedure:

> Aloe, 50 grams, is boiled with hot water (300 cc.) and hydrochloric acid, 2 cc.; the resultant solution is allowed to cool and the supernatant liquid decanted from the separated resins.
>
> Stronger ammonia water (50 cc.) is added to the liquid, then a solution of calcium chloride (15 grams in each 30 cc.) is slowly added with stirring, the mixture is set aside for from fifteen to twenty minutes to permit precipitation. The cake, obtained by collecting it on a filter, draining, pressing, freeing from moisture and filter paper, is then broken up in an evaporating dish, and cautiously acidified with hydrochloric acid. Aloin may thus be completely crystallized, usually within thirty minutes, then collected on a filter and washed with a saturated solution of aloin, dried by draining, pressing and heating, for several hours at a low heat (not over 50° C.). The minimum amount of aloin suggested is 19 to 20 per cent.
>
> While, as we understand, fairly concordant results have been obtained for Curacao Aloe, difficulties have been experienced in isolating aloin from Cape Aloe. Aloe, containing 20 per cent. of aloin, is acceptable to the trade.

Kiefer (13), using Cape Aloe, investigated the method for the evaluation of aloe, adopted by the Swiss Pharmacopœia, and also the justification for the requirement of at least 80 per cent. of substances, soluble in chloroform-methyl alcohol. He found among other facts: (1) that the effect of the substances, insoluble in a chloroform-methyl alcohol, was toxic, but without purgative action on mice or man; (2) that the chloroform-methyl alcohol extract was much more active, when evaporated in vacuo, than when evaporated on the steam bath; (3) that chloroform-methyl alcohol dissolves also inactive water soluble substances. He found 17 per cent. and suspected a varying amount, larger or smaller, in various commercial samples. The official method, he concludes, has theretofore hardly much significance. Both aloin and aloe-emodin, isolated by himself, were found little active; resin-fractions, soluble in sodium bicarbonate and carbonate, were very active. Their quantitative separation and determination—on account of the involved steps for purification, was judged by him much too complicated to be suitable for an official method. The active resinous ingredients could not be obtained in pure crystalline conditions.

IV. Physiological Evaluation

In general the physiological assay methods have proven as unsatisfactory as the chemical tests for the evaluation of aloes and other cathartics. (See also the work of Seel (14), and Tschirch (15)).

Biological Assay Methods

In a recent survey the results obtained with various animals are reviewed. We quote from the recent handbook of Quantitative Pharmacology, "Bio-Assays," by Dr. J. C. Munch (2).

1. *Fish:* The reports (with cathartics) do not suggest any characteristic response by the fish; accordingly tests upon these animals do not seem to offer possibilities for quantitative assays.
2. *Mice:* Mice stored and fed under laboratory conditions showed enormous variations in the normal rate of passage of food along the gastro-intestinal tract. In a series of preliminary examinations concordant results were not obtained in testing castor oil, aloin, podophyllum or fluid extract of cascara.
3. *Rabbits:* Rabbits appear too sensitive to cathartics to be used for bio-assays.

4. *Cats:* Though cats were found to be very serviceable for testing cathartics, the sensitivity of different animals varied greatly. The minimum effective dose of each cathartic was essentially constant when tested upon the same animals at weekly intervals over a period of several months. Differences in dosage of 25 to 50 per cent. could be detected without difficulty. Smaller differences in dosage were detected upon sensitive cats.
5. *Dogs:* Dogs have proven more variable and more difficult to standardize than cats. The possibility of constipation complicates their use for assay purposes.
6. *Man:* Because of the great variation in activity of the gastro-intestinal tract of the same person at different times, as well as of different persons at the same time, marked differences in response to cathartics have been observed.

Conclusion: Tests upon cats have given more satisfactory and consistent results than tests upon mice, dogs or men. The accuracy of results (testing the same cat?) is usually between 20 and 50 per cent.

Realizing the limitations of the test animals, found unsatisfactory for biological testing of cathartics, the advantages and disadvantages of using the cat were considered. The use of the cat is suggested by the comparatively favorable report, cited above, as well as its employment in Vieth's experiments in which are determined, in a systematic survey, the effect of oxyanthraquinones.

Of interest in this connection is the fact, however, that hexaoxyanthraquinone, found ineffective to the cat, proved laxative to man. Therefore Oswald in his book (1924) on "Chemical Constitution and Pharmacological Effect" concludes the results obtained with the cat are not to be transferred without reserve to human beings and urges a renewed systematic survey.

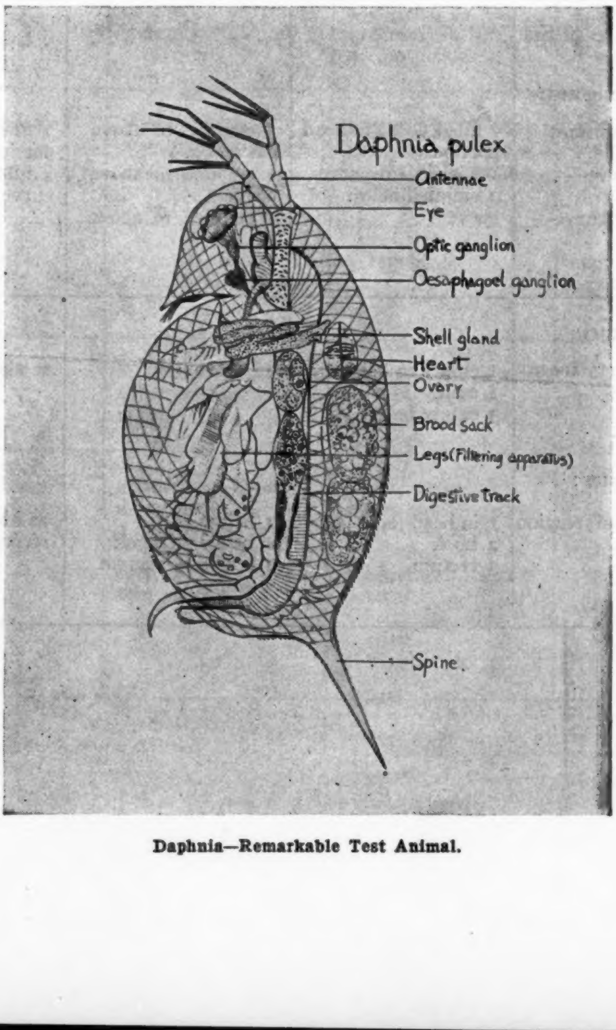
The disadvantages of using cats were:

1. The need of selecting specially sensitive animals.
2. The need of using the same sensitive animals.
3. The need of weekly intervals and continuance of the experiments over a period of several months.
4. The limited accuracy (at best about 20 to 50 per cent.).

5. The restriction to a limited number of animals.
6. The difficulty of controlling such factors as uniform age, food consumption and vitality, deemed necessary for comparative studies.

The Daphnia as a Biologic Test Animal

The Crustacean daphnia as a test animal was chosen for additional experiments since experience with this remarkably highly-organized water insect had already proven its value in other quantitative tests carried on by the author. (16-22.) It was believed the disadvantages, cited above for cats, could be overcome with daphnia. Preliminary results recorded on Tables 9 and 9a were encouraging.



Daphnia—Remarkable Test Animal.

TABLE 9

PHYSIOLOGICAL EVALUATION

Aloe (Curacao)	Aloin (extracted from it)	Resinous Residue after Aloin extraction	Check
Concentration: 0.4 per cent. Number of animals: 5 Age of animals: 2-3 weeks Results After 20-25 minutes: Slow visible evacuation, progress not very striking	Visible evacuation, obvious progress	Slight evacuation	No visible evacuation
Addition of 0.5 cc. of Sol. Results After 50-55 minutes: Very obvious constant evacuation 2 emptied to curve—about middle 2 emptied below curve—below middle 1 empty	1 filled, loose in head portion 1 emptied to curve 3 emptied below curve	3 emptied to above curve (½) 1 emptied to above curve (½) 1 emptied to about ⅓	1 filled in head portion 4 filled to above curve
After 60 minutes: 2 down to ½, very loose 2 down below ½ 1 empty	1 empty in head 1 empty ½ 3 empty below ½	as above	as above
Results After 90 minutes: 3 down to rectal portion (very loose) 2 empty	1 in head loose 2 hook 3 rectum	1 below ½ 2 below ⅓ hook 1 below ¼ rectum 1 empty	as above, no striking change

TABLE 9a

PHYSIOLOGICAL EVALUATION (Continued)

Aloe	Aloin	Residue	Check
After 120 minutes: 4 empty 1 practically empty	3 emptied to below ⅓ loose 2 empty	1 emptied to about ⅓ 2 emptied to rectal proportion 2 empty	3 above curve (½) 1 about middle 1 about⅓
After 150 minutes: all empty	1 emptied to ¼ 2 emptied to rectum 2 empty	1 emptied to ¼ 1 emptied to less (rectum) 3 empty	3 above curve 1 below middle 1 emptied to ¼
After 180 minutes:	1 emptied to ¼ 2 practically empty 2 empty	1 emptied to rectal portion 1 practically empty 3 empty	1 above curve 2 at curve 1 below curve 1 emptied to ¼
After 13 hours:	1 rectal portion 1 practically empty 3 empty	5 empty	none completely empty
After 14½ hours:	All show some action after washing in 2 cc. culture H_2O	All quite active after washing in 2 cc. culture H_2O	
After 15½ hours:	4 heartbeat slowed down about ½ 1 heartbeat slowed down about ¼ None rise above bottom in tube	3 very active 1 less active 1 still less active The same 3 heartbeat almost normal 3 breathing almost normal 2 slightly slower	

Evaluation of Aloe, Aloin and Residue by the Aid of Daphnia

Two methods were devised for observing the effect of the drugs in aqueous, weakly alkaline, culture water solutions of aloe or aloin of known concentration; first, the plate method, placing the animals on a gauze netting, fitted into the opening of a flat glass dish and placing 1 cc. of the solution over the animal. The observation was made at various magnifications, either direct or by reflection upon a ruled screen, permitting a quick and simple quantitative check. The distance from the projection screen was so adjusted that the animal's food canal always could be measured in 21 field or 100 per cent., if completely filled. (Tables 10-13.)

The second method practically replaced the first. Specially designed tubes were used, in which was placed 0.5 cc. to 1 cc. of the test solution. The result in these tubes could be seen more readily, the animals being kept in normal motion, and rapid oxidation in the solution being avoided.

The results are illustrated on the various tables, 14-28, where the necessary details are given concerning the conditions of experimentation. The effect of concentration upon speed and extent of defecation is clearly noticeable, as is also the difference between the Curacao Aloe, Aloin extracted from it, the Curacao Aloe residue (deprived of all but 2 per cent. of aloin) and Cape Aloe. Prolonged standing of slightly alkaline solutions increases somewhat the speed of evacuation—in all but the Cape Aloe. In Cape Aloes, judging from somewhat limited data, this is not the case.

The animals must be in perfect condition, well fed and properly kept to give uniform and speedy results. In starved animals complete evacuation, though often speedy in the beginning, is long delayed; the animal even succumbs before it evacuates. (See Table 23.) Obviously in less vital animals the toxic condition is more readily obtained. The strong laxative effect of the residue of Curacao Aloe, from which the Aloin had been extracted, is most interesting, as it is more speedily active than Aloin—or even one sample of Cape Aloes. Aloin is definitely absorbed by the kidney and may serve as a remarkable vital stain, coloring the kidney cells deep red upon prolonged contact. The vital stain is, of course, observed when Aloin is present in the Aloe.

Conclusion

The harmful effect of Aloin upon the human kidney has been suspected, the limited laxative value of Aloin has been repeatedly mentioned by various workers, who tested Aloe and Aloin on mice, cats and human beings.

1. The chemistry is by no means sufficiently cleared up to permit chemical evaluation of Aloe species.

2. The physiological evaluation has been accomplished with daphnia.

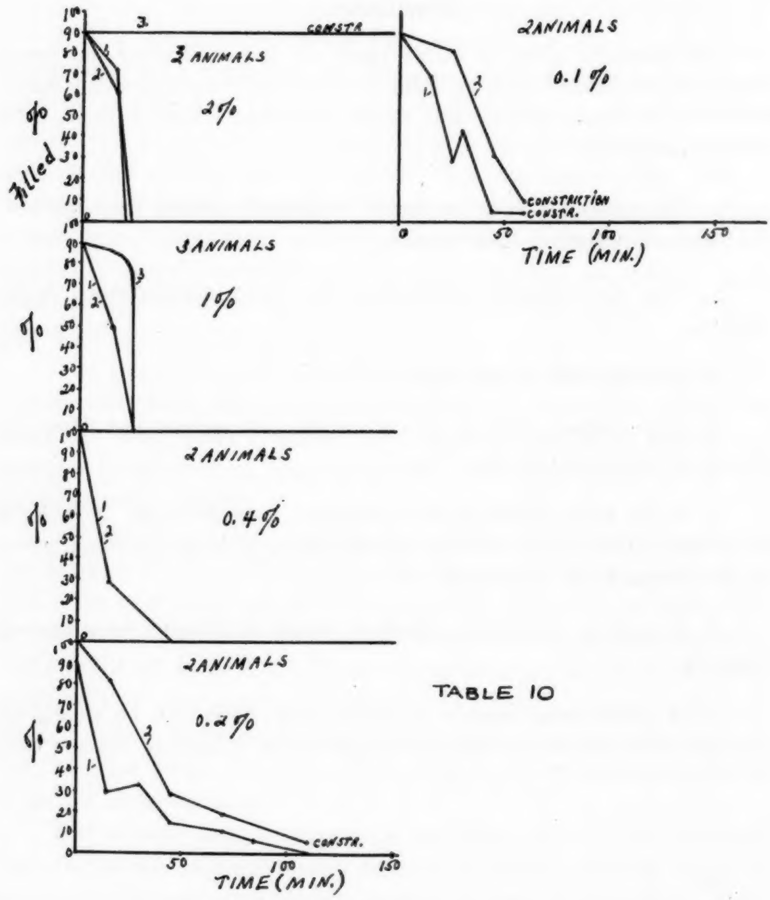
3. Curacao Aloe is strongest.

4. The residue, freed from all but about 2 per cent. of Aloin, is almost as active as Curacao Aloe.

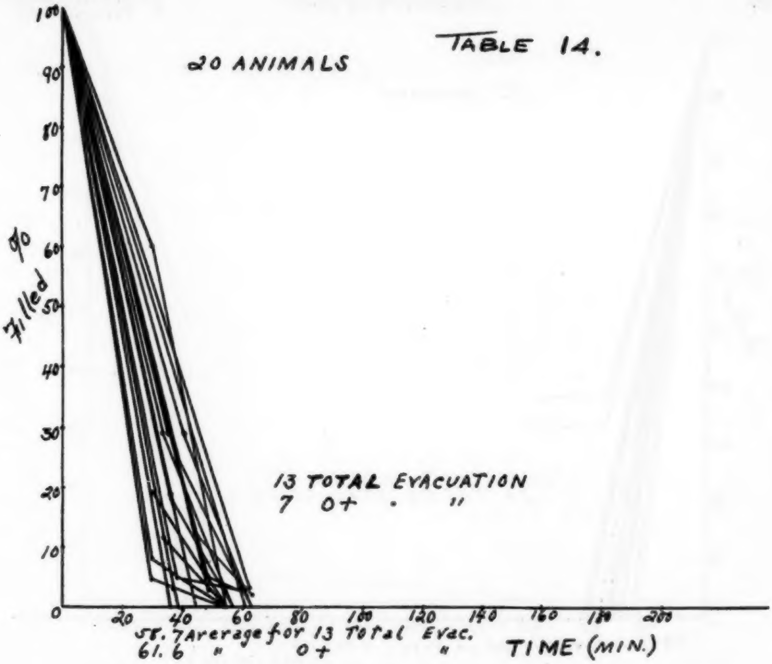
5. Aloin while decidedly less effective, is more toxic. It affects the kidneys, the intense red dye formed, upon prolonged contact, serving as a remarkable vital stain.

6. A slightly increased activity is noted in alkaline solutions on standing.

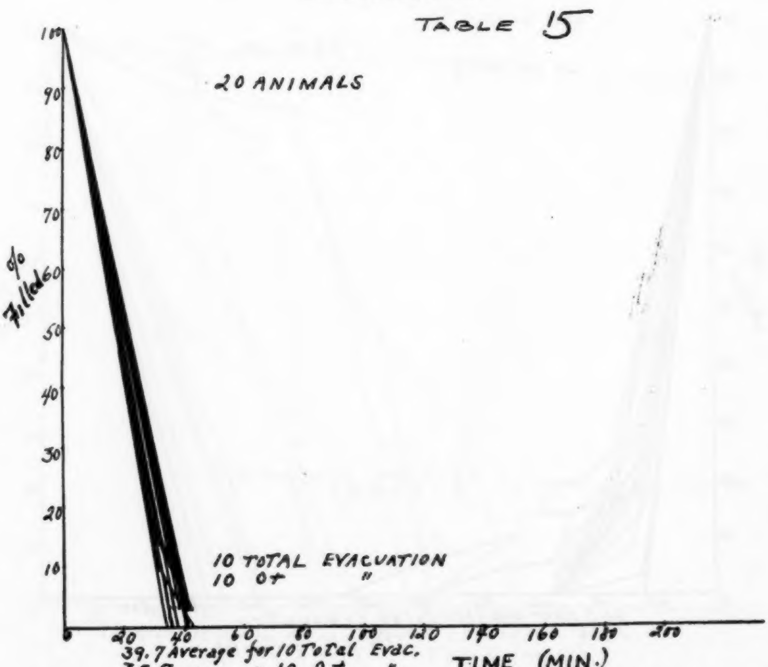
7. A commercial sample of Cape Aloe, while not as strong as Curacao Aloe, showed an activity comparable to Aloin but not so toxic.



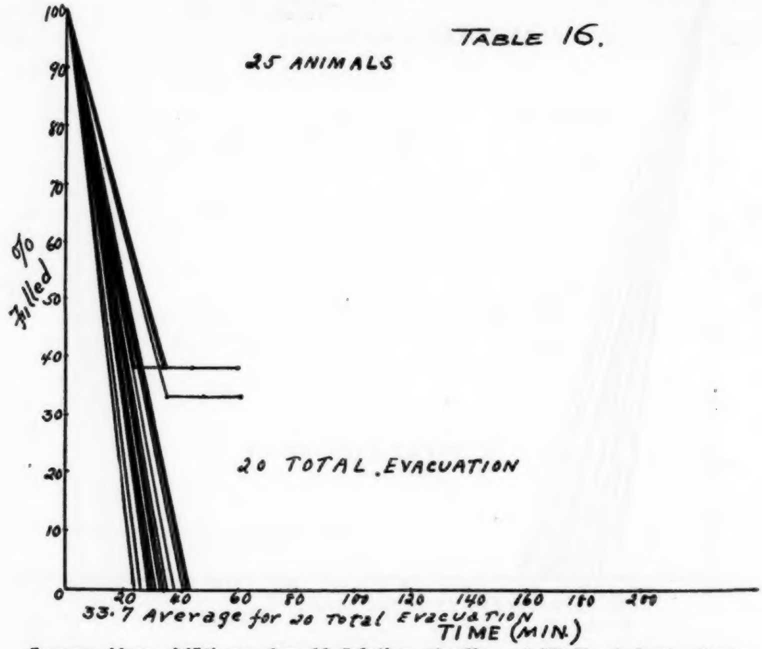
Curacao Aloes.—Effect of Aqueous Solutions in Decreasing Concentration. (Plate Method.)



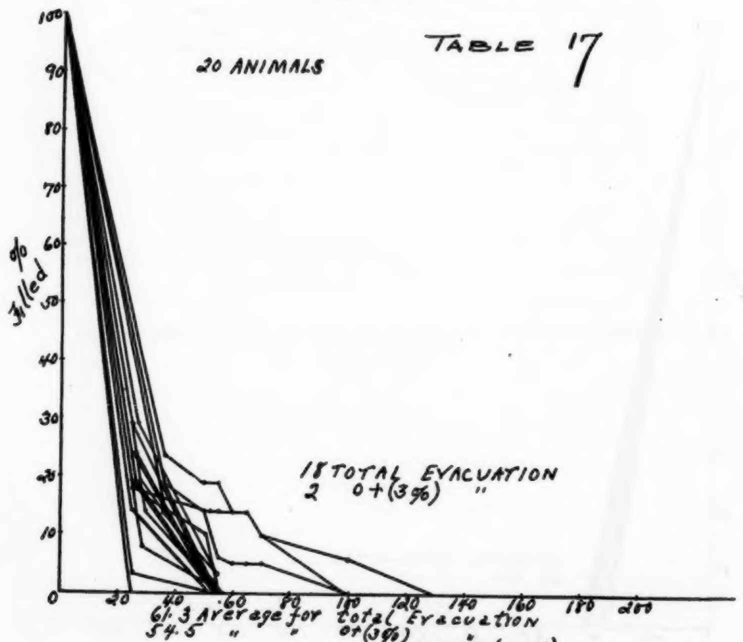
Curacao Aloes.—.05% Fresh Solution, at 78° F., by the Tube Method. Animals about ten days old.



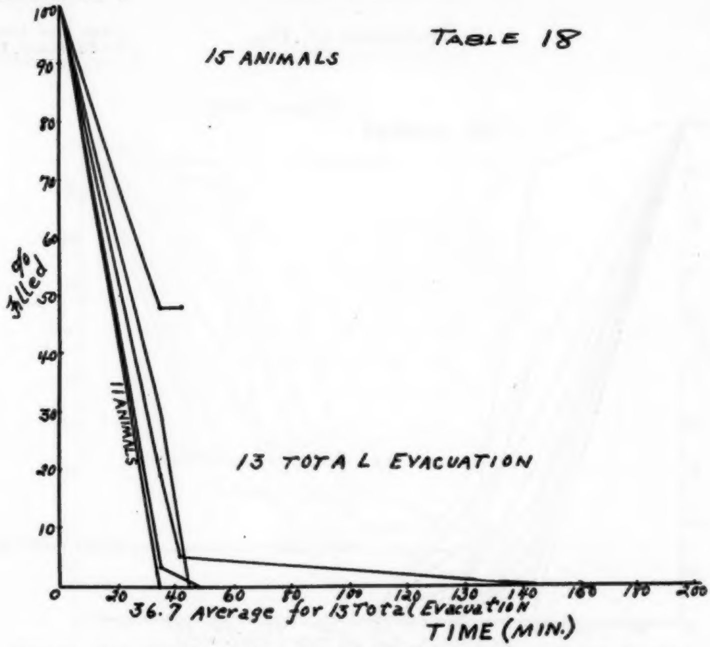
Curacao Aloes.—.05% Fresh Solution, at 76° F., by the Tube Method. Animals about sixteen days old.



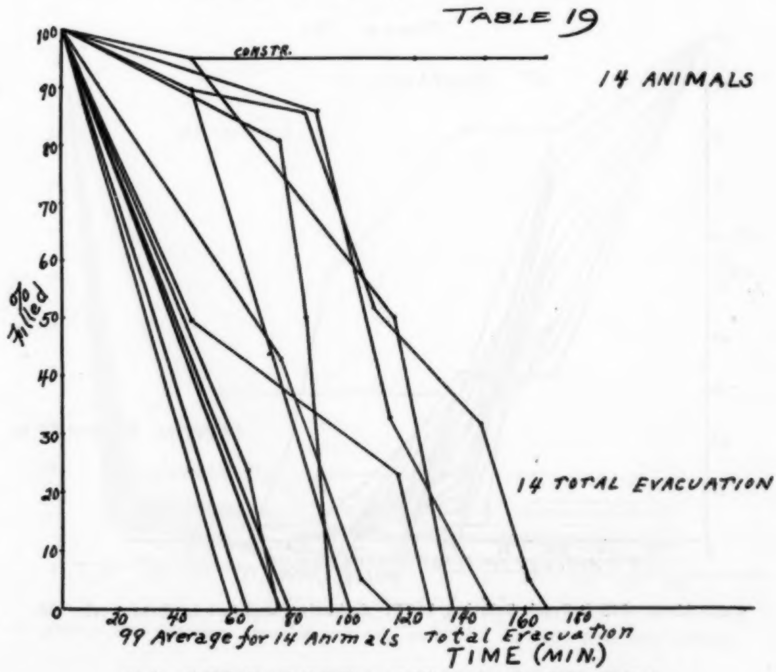
Curacao Aloes.—0.05% one-day-old Solution, standing, at 75° F. Animals about fourteen days old.



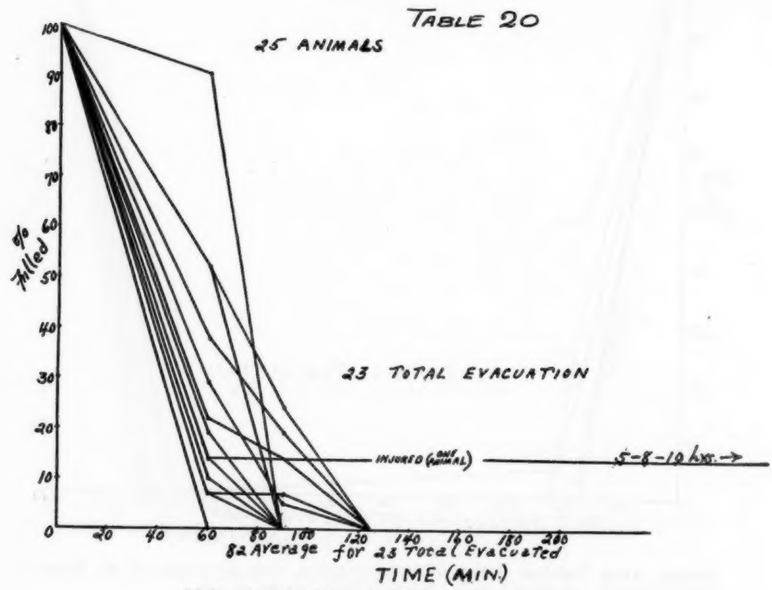
Curacao Aloes Residue.—0.05% Fresh Solution, 77° F., Tube Method. Animals about ten days old.



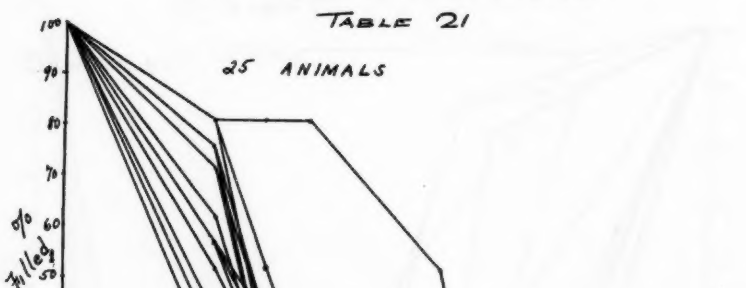
Curacao Aloes Residue.—0.05% Filtered Solution, four days old, 78° F., Tube Method. Animals about three weeks of age.



Aloin.—0.05% Fresh Solution, at 76° F., by the Tube Method.

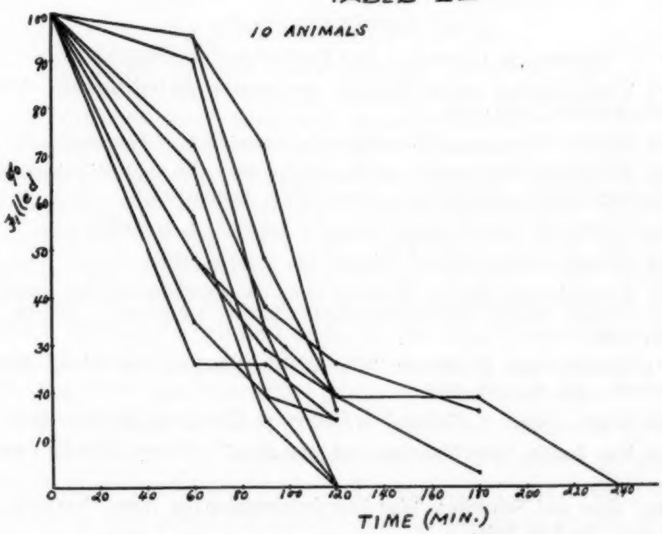


Aloin.—0.05% Solution, standing four days old.



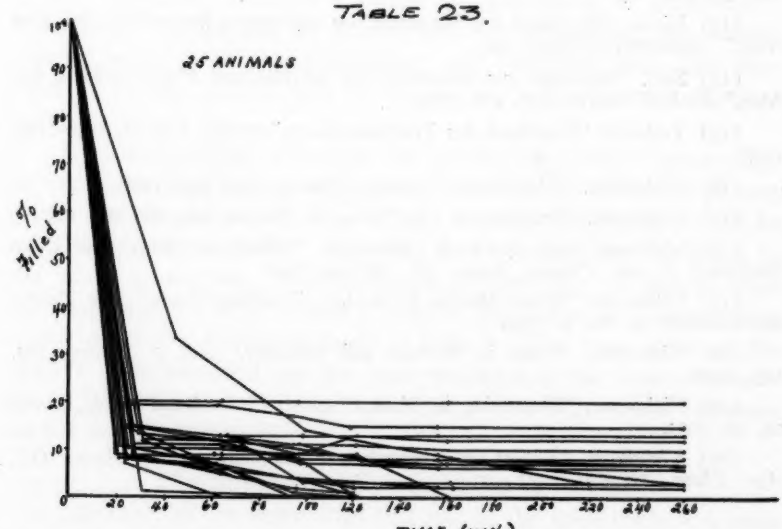
Cape Aloes.—0.05% Fresh Solution, 74° F. Animals about two to three weeks old.

TABLE 22



Cape Aloes.—.05% Solution, old, standing five days.

TABLE 23.



Aloin.—.05% Solution, standing one day, at 75° F. Animals from poor culture.

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SPICES AND THE CARIBBEES

By J. Norman Taylor, M. Sc.

Thus to the Eastern wealth through storms we go,
But now, the Cape once doubled, fear no more;
A constant trade wind will securely blow,
And gently lay us on the spicy shore.
—Dryden, *Annus Mirabilis,* St. 304.

WE sailed into the harbor of Kingston shortly after sunrise one glorious morning some four hundred and forty years after the great Admiral discovered the island of Jamaica—the "Queen of the Caribbean"—thus completing a most fascinating voyage among the West Indies. As we look back on this trip, it seems remarkable that such a small thing as a list of spices should have brought about such a delightful and instructive journey. But so it was.

And thus it came about. While attending college in Philadelphia our curriculum had included the subject of economic geography. In this study we had learned about the geography and botany of the Orient, using as a guide the crude drug list prepared by Mr. W. M. R. Wharton, Chief of the Eastern District of the Federal Food and Drug Administration. Later on we had traced the influence of spices upon trade routes using as our guide a spice list likewise prepared by Mr. Wharton. We also developed a "philosophy of geography", making our studies full of human interest, broadening our knowledge of world history and changing cold statistical facts into concepts of human activity and of commercial and industrial development.

By thus selecting for study the habitat of a single commodity, or some specialized group of commodities, one is enabled to picture events and peoples in far away lands. Indeed, geography should be more than a mere catalog. It should lend romance and vividness to the world around us. It should give perspective. It should train the imagination. Why is there a demand for coffee in Mohammedan countries, or for vegetable foods in India? Why have some of the world's most beautiful textiles been produced in the Vale of Kashmir? Why did the search for spices exert such a profound influence on the world's history?

The Influence of Spices on Trade Routes

The story of the beginnings and rise of the spice trade is a most romantic one. The origins of the useful spices and aromatics were

in the traditional cradle of mankind and the pursuit of them led as much as anything to the discovery of the New World, the southeastern sea route around the Cape to the East Indies and the southwestern passage through the straits. Naturally in those days transportation costs were high, the demand for spices was increasing and their use was expanding. They were valued at almost their weight in gold by the early explorers—Vasco de Gama's spice cargo from India in 1497 yielding a profit of 6000 per cent.

Almost all the spices are indigenous to southeastern Asia—the Moluccas, British India (Malabar), Ceylon, Straits Settlements and Netherland India. Southern Asia and the adjacent islands were the earliest scene of the spice trade, and the starting point of the earliest commerce between the oldest peoples of central and southern Asia appears to have been the territory between Tibit and Kashmir. Not only spices but the noble metals, silk and jewelry were traded in. To Attock were brought the products of the Chinese Empire which at an earlier date closed its markets to the rest of the world. Caravan roads led from Attock north to Samarkand and south to Kandahar. From the latter point they wound westerly to Babylon on the Euphrates.

World trade gradually expanded and the Phoenicians—merchants, manufacturers and mariners of antiquity—became the chief agents between the Orient and the Occident, Sidon and Tyre being prominent commercial centers. In the course of time shipments were made over the Bay of Bengal *via* Ceylon, and distributed from centers on the Persian Gulf and the Red Sea. Trade in spices was carried on with India and China by the Arabs, and large quantities were supplied to the luxurious courts of the Caliphs. Still another change took place when the Levant, centering in Venice and Genoa, was at its height. At the time of the Crusades the advancing hordes of Islam seized Constantinople, the key to the East, and commerce was consequently paralyzed.

"Pepper and Co." Discover America

It became imperative therefore for the Old World to seek new markets, new sources of supply and new trade routes. As has been so aptly said: "The history of geography, which leads to the geography of today, is a record of achievement, colonization, trading, conquest, religious zeal, and scientific endeavor. The nomads move because the environment will not support them. Disturb an environ-

ment and see the result. Block the trade route from Europe to Cathay as did the Turks and a new world is discovered."

A momentous event in the history of the human race took place in 1492 when Columbus embarked on his search for a short route to India. He was not going blindly however. It will be remembered that as a lad he had read Marco Polo's book of travels and had accepted the belief, then current among some geographers, that the world was round. He also was aware that in late summer a northeast trade wind would carry him out past the Azores towards the land of his goal. And so in August, 1492, three tiny ships launched out on their adventuresome quest "to probe the secret of the sphere". There was no turning back—

> Behind him lay the gray Azores,
> Behind, the gates of Hercules;
> Before him not the ghost of shores;
> Before him only shoreless seas.
> The good mate said: "Now must we pray,
> For lo! the very stars are gone.
> Speak, admiral! what shall I say?"
> Why, say, "Sail on! sail on! and on!"

Caravel and Galleon

What a stir and bustle there must have been in Palos on that summer day when the little caravels braved the unknown dangers of uncharted seas. But the excitement could have been no greater than that attendant upon the comings and goings preliminary to our setting sail in "the galleon of our conceit," for that romantic region in the Caribbean that the great Discoverer found. Is not the call of the sea, the urge to high adventure and the lure of strange lands and islands of romance, as strong in one today as with the ancient mariners? Small wonder in a season when one could hardly pick up a newspaper without seeing an account of an expedition in search of lost or buried treasure, or on pleasure bent to the Caribbean, that we too felt the urge to rediscover those blissful islands of the West. Perhaps, too, we were influenced by their fascinating names such as for example—Antigua, Barbados, St. Lucia, Martinique, Tobago, Grenada, *et alia*.

Be that as it may, one bright morning shortly after school closed saw us fare forth upon the deep. Just before sailing from Philadelphia we visited the Food and Drug Laboratories in the Federal Building and were shown how actual examinations are made of spices

imported into the United States. The consumption of spices in this country is very large and how important they have become in our dietary is indicated by the importation in 1933 of over 98,000,000 pounds. Many foreign countries furnish these large supplies of spices which reach our shores and every pound is subject to Federal inspection in the Food and Drug laboratories before entering into United States commerce.

The value of the work carried on by the Federal Food and Drug Administration in its enforcement of the Pure Food Law cannot be estimated. Its services to the country are invaluable, and while the provisions of the Food and Drugs Act are at present inadequate to meet many situations demanding correction—the Act has, during its existence, contributed greatly to the amelioration of social conditions with a consequent improvement in the well-being and happiness of our people. It is a tribute to those enforcing the Food and Drugs Act that notwithstanding the many economic and social changes since its passage in 1906, it has both protected the consumer and helped the manufacturer. A new bill, designed to give greater protection to the consuming public, is now before Congress.

Anchors Aweigh

Sailing from the City of Brotherly Love, we passed down the historic Delaware into the Bay, out past the Breakwater and were soon speeding down the coast. Now the sea is blue as we enter the Gulf Stream, and with a fair wind we are soon rolling along the Cuban north coast over a sparkling summer sea. Leaving the "Pearl of the Antilles" behind, we skirt the shores of *Hispaniola* and are now well started on our way. The cluster of islands and islets forming the West India Archipelago, and constituting the Greater and Lesser Antilles are the peaks of a submarine mountain-chain which sweeps in a curve from Yucatan to the eastern termination of the Venezuelan coast range. The Greater Antilles, which lie to the north, include the islands of Cuba, Hispaniola, Puerto Rico, and Jamaica. The Lesser, situated roughly at right angles to the Greater, and linked to them by the Virgin Islands, are divided into the Leeward and the Windward groups, which form an irregular crescent to the east and separate the Caribbean Sea from the Atlantic. American, British, French and Netherland possessions are here.

We pause for a little while at *Puerto Rico,* non-contiguous territory of the United States, and from there proceed to the Virgin

Islands, famous for its bay rum, where we cast anchor for a brief visit. The American Virgin Islands consist of the islands of *St. Thomas, St. John* and *St. Croix* (together with some smaller islands), purchased by the United States from Denmark. Although the islands are in the tropic zone, the constant northeast trade winds render the temperature remarkably even and the climate healthful.

Pieces of Eight. Buccaneers and the Spanish Main

As one drops anchor in the magnificent harbor of St. Thomas, the capital of the islands, one's thoughts turn to the romantic story of its past and the legendary characters said to have frequented its shores. Two round towers on the summits of twin hills recall the days of the "Jolly Rogers." The smaller known as Black Beard's Castle is supposed to have been the haunt of Edward Teach, alias Black Beard, an old villain of the eighteenth century. The larger is called Blue Beard's Castle. Writes Sir Frederick Treves: "Of Blue Beard nothing whatever is known, nor do even the sellers of post-cards suggest that he was in any way connected with the famous autocrat of the nursery tale. Black Beard, however, was a definite character, a pirate of France, who in the early part of the eighteenth century was the terror of the Caribbean Sea. I can find no evidence that he ever held the mill-like tower which keeps green his memory in St. Thomas, but it would be rank heresy to suppose that such evidence is not forthcoming." Teach, or "Blackbeard" did, however, live in the Bahamas and these islands were for a time the home of daring adventurers and sea rovers.

Although the West Indies were first discovered and exploited by the Spanish, the region was later explored by England, France and the Netherlands and possession taken of islands in the Caribbean Sea not yet occupied by Spain. War followed, but upon the declaration of peace continued in the form of piracy. Privateering, buccaneering, pirating or what have you became very profitable and to some extent "respectable,"—Morgan, a notorious leader being knighted by Charles I and made Lieutenant-Governor of Jamaica, no doubt however to clear the seas of pirate bands. Captain Kidd (said to be much maligned), Flint and his bloody crew are other names prominent among the "Brethren of the Coast." The pirates made Tortuga, a small island off the northern coast of Haiti, their headquarters, and "it is believed to contain more buried treasure than any other island in this region." Jamaica was later made their ren-

dezvous, Port Royal being the home port of pirate vessels playing havoc with treasure ships of the Spaniards as they came up from the Spanish Main.

The Caribbees

Continuing on our journey and steering now to the southeast we pass *Saba Island* to the right, with *Barbuda* further to our left, and approach *St. Kitts* (St. Christopher), a small island in the Leeward group. St. Kitts is said to have been the first island of the Lesser Antilles colonized from Europe (1623). *Nevis,* a companion island, is famed as the birth place of Alexander Hamilton. To the east of St. Kitts lies *Antigua,* discovered by Columbus and named by him after a church in Seville. It is the most important of the British Leeward Islands.

After a short run one sees *Montserrat,* another "Emerald Isle" and approaches *Guadeloupe,* the largest of the Lesser Antilles—an island as essentially French as is Barbados English. Guadeloupe really consists of two islands separated by a narrow strait—Guadeloupe itself and Grande-Terre. Other nearby dependent islands are *Marie-Galante, La Désirade* and *des Saintes.*

We touched at the capital, Basse-Terre, located on an open roadstead, just long enough to lay in some ship-stores. Evidently the Frenchmen who first settled the islands went there to remain judging from their selection of sites for settlements and the fine system of good roads which they built to connect their cities. It happened to be market day when we landed and at the market place surrounded by tamarind trees there were gathered hundreds of natives with their produce to sell or exchange for other necessities. We were especially impressed with the remarkable beauty, both of form and feature, of the bronze Venuses. Here they gather from all quarters of the countryside carrying their wares on their heads.

Now south again and we come to *Dominica,* the southernmost and largest British island of the Leeward group, and well known for its limes and bay oil. It is mountainous and picturesque, and Roseau, its capital, located near the southwestern point of the island has no harbor but sits right out in the Caribbean. We next pass *Martinique,* rugged and mountainous. Several volcanoes, one of which, Mont Pelee, in an eruption in 1902, destroyed the city of St. Pierre and almost all of its 35,000 people.

Leaving now the Leeward Island group we continue our course and reach *St. Lucia,* the largest of the Windward Islands. Just below Soufriere Bay the voyager sees the remarkable twin peaks known as "The Pitons," unique in conformation and rising sheer from the sea to a height of 2620 feet, in the case of Gros Piton, and to 2460 feet in that of the Petit Piton. Gliding southward through sapphire seas we pass on our left the island of *Barbados,* sometimes known as Little England. It was here that George Washington and his brother Lawrence sojourned in 1751-52, and it was in beautiful St. Michael's Church that they worshipped. Lovely Codrington College is also located here. The island is the most easterly of the West India Islands, and has never been out of Britain's possession. The next of the stepping stones is *St. Vincent,* also in the Windward group, and further to the south, separated by a narrow channel, are the low-lying *Grenadines.*

We Visit Grenada's Nutmeg Groves

On arriving at *Grenada,* one of the southernmost islands and capital of the Windward group, we come to anchor and pause for a few days before starting on our return north. Grenada is rugged and highly picturesque, and terminates this chain of islands of volcanic origin. Its soil is extremely fertile, its climate healthful and its scenery unsurpassed in this region. Its capital, St. George, with one of the finest harbors in the West Indies, presents a most exquisite picture viewed from the sea, the mountains in the distance towering aloft to their cloud-wreathed summits.

Grenada has variously been called the "Isle of Spices," the "Planter's Paradise," and the "Island of Nutmegs." Its vegetation is bountiful and among other things it produces nutmegs, cinnamon, cloves, ginger, cocoa, coffee and kola nuts and a visit to its spice plantations is well worth while. Particularly beautiful are the groves of clove and nutmeg trees gleaming among the vegetation of its rich plantations and lovely gardens. What is claimed to be "the largest nutmeg plantation on earth" lies among its hills.

Although a native of the Moluccas and other neighboring islands, the nutmeg was carried to Grenada many years ago and found there a very congenial home. The tree yielding the nutmeg, *Myristica fragrans,* is a bushy evergreen and attains a height of from forty to fifty feet, but in cultivation it rarely grows to half this height. The leaves are pointed, bright green and somewhat glossy on their upper surface. The fruit which appears on the tree mingled with the flowers, is round or oval, and resembles a small

apricot. Within the fruit is a large shining brown nut with a fleshy crimson envelope or *arillus,* commonly called mace—another of the island's exports. The kernel when dried and cured, is carried down from the hills in baskets on the heads of natives and shipped to the outside world as the nutmegs of commerce. We spent several most entrancing day in the incense-laden air of this charming little island, a veritable paradise of sunshine and flowers set amid turquoise seas.

We regretted very much that we were unable to stop at *Trinidad* or *Tobago* (Robinson Crusoe's old home) or at *Curacao* but upon leaving St. George we made straight for Kingston, our last port of call, arriving there after glorious days and nights of sailing under tropic skies. Golden days and purple nights. In the words of Hearn: "tropical nights have a splendor that seems strange to northern eyes. The sky does not look so high—so far away as in the North; but the stars are larger, and the luminosity greater. With the rising of the moon all the violet of the sky flashes—there is almost such a rose-color as heralds northern dawn."

Beautiful Jamaica

Rose-tinted dawn, lemon-flecked skies and Jamaica. In the distance we discern the Blue Mountains overhung with haze. As we near shore the landscape gradually unfolds, groves of palms appear in the foreground and we sail along a curved spit of sand—the Palisades—into Kingston harbor—Port Royal.

Discovered in 1494 by Columbus and called by him St. Jago (later given the native name after Xaymaca—well watered) Jamaica is the largest of the British West Indies and is famous for its coffee, ginger, pimento (allspice) and rum. In addition to sugar and bananas, which are the chief products, dyewoods, cocoanuts, cacao, ginger, pimento and other spices, sarsaparilla, rum and fruits are largely exported. Tobacco and tea are grown to some extent.

During our stay in this wonderful isle of tropic splendor and decided charm we visited the Institute of Jamaica, with its famous historical collection; Hope and Castleton Gardens with their remarkable botanical displays; the Bog Walk and some of Jamaica's springs and waterfalls. One brilliantly beautiful morning we visited the neighborhood of St. Anne's Bay. Of it one writer says: "Earth has nothing more lovely to display than the pastures and pimento groves of St. Ann, nothing more enchanting than its hills and vales, delicious in verdure, and redolent with fragrant spices. Embellished

with wood and water, from the deep forests whence the streams descend to the ocean in cascades, the blue haze of the air blends and harmonizes all into beauty." The native allspice or pimento tree grows here and its silvery bark and glossy green leaves are indeed beautiful. The scent of the berries fills the air, and one is lulled by the hum of the bee and the roar of the waterfall, says a native writer.

The tree, *Pimenta officinalis,* is a handsome evergreen, some thirty feet in height, and commences to flower when seven to ten years old. It is indigenous to the West Indies and abundant in Jamaica. The crops of berries are gathered upon attaining their full size, but while yet green, and are carefully dried in the sun. They are then put into bags and casks for exportation.

On another day we visited the picturesque Bog Walk not far from Spanish Town in the Vale of the Rio Cobre. "Imagine everything that makes scenery lovely:" wrote Lady Brassey, "wood, water, and the wildest luxuriance of tropical foliage, mingled and arranged by the hand of Nature (in one of her happiest moods), and then picture all this surrounded by lofty and abrupt precipices, with a background of the most brilliant hues illuminated by the brightest of suns. Passing out, the sides of the ravines become less precipitous and are clothed with all kinds of tropical trees, such as the breadfruit and bamboo, besides vast quantities of flowering orchids."

Homeward Bound

Although it is said that nothing moves rapidly in the tropics, time indeed seemed to accelerate its speed and the day of our departure came too soon. Much to our regret we were unable to visit the Caymans (Grand Cayman, Little Cayman and Cayman Brac) and the other outlying islets but we hope some day to go back to "summer land" and stay longer.

Another "little journey" and study with Mr. Wharton is past. Now back where skies are gray and winds are chill, we oft recall those spicy breezes blowing soft o'er the Caribbean. With Allister Macmillan we too feel that

"Of all the beauty spots of Earth, the fairest and the best
Are the jewels of the Caribbean, the Islands of the West,
Where Nature in profusion great her choicest gifts bestows
In land and sky, in temperature, in everything that grows.
The splendor of the sunsets there words never could convey,
The glory of each dawning day no artist could portray—

The soft chromatic harmony, the visions that suggest
The loveliness of other worlds, the regions of the blest.
Such are the western islands in a sunny, sapphire sea,
With its flashing flying-fishes and its crooning lullaby,
As its billows, flowing ever from the vast infinity,
Break on sloping sandy beaches in white foaming purity."

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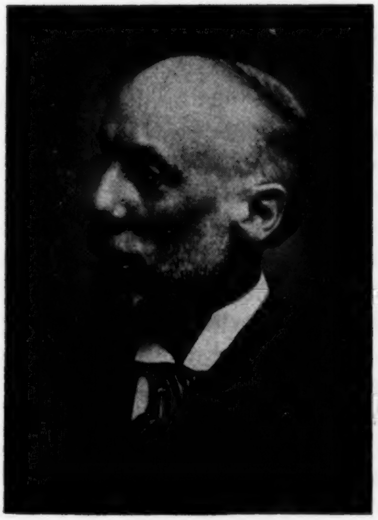
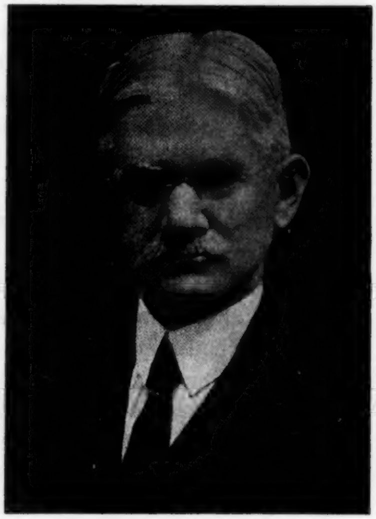
IN MEMORIAM



Frederick B. Kilmer



William L. Cliffe

THE HEAVY hand of death has fallen again upon the loyal group that serves the College in executive capacity. Within a few days of each other, these two splendid men, sterling friends of the institution, high-minded, capable men, have traveled the long road, to that bourne whence none returneth.

Frederick B. Kilmer was an inspired toiler in the vineyard of the sciences, cultured litterateur, gifted researcher, poet and parent of the illustrious Joyce Kilmer, who gave the world that never-to-be-forgotten poem, "Trees."

William L. Cliffe was friendly to the core—a reliable, clear-thinking, patient and loyal gentleman. His quiet presence was in itself an inspiration to any group, anywhere. Each had contributed much to the professions which they so faithfully served, and the record of their lives, appended herewith, is but a scant survey of the good that they did to their fellow men during their long and honorable careers.

Frederick Barnett Kilmer was born in 1851 in the village of Chapinville, Conn., the son of Charles Kilmer, a minister of the gospel, and Mary Langdon Kilmer. His early education was obtained in the public schools of Binghamton, N. Y., the Wyoming Seminary, Kingston, Pa., and his technical training at the New York College of Pharmacy. Additional courses in chemistry were pursued at Columbia, Yale and Rutgers Universities. In 1899, after a brief period spent in a New Brunswick pharmacy, he joined the firm of Johnson & Johnson, of Red Cross fame, and soon became head of its scientific department, a position which he filled with satisfaction to the day of his death. His capacity to preserve the modern perspective, despite his advanced years, enabled him to continue in harness long after the age when most men feel the urge to rest and watch the world at work. All through his life he was industrious and well versed in all his diversified employments, and those who contacted him, even after eighty years had lain their heavy hand upon his physical frame, marveled at his strength of mind and the vigor of his viewpoints.

For years he served as president of the New Brunswick Board of Health, a director of the St. Peter's General Hospital in New Brunswick, and adviser to the New Jersey State Board of Health. For over a decade he was a member of the board of trustees of the Philadelphia College of Pharmacy and Science, and his services and benefactions to the institution were numerous and sensibly ordained. He was for several years collaborating editor of the AMERICAN JOURNAL OF PHARMACY. In the College conferred upon him the degree of Master in Pharmacy (*honoris causa*) and no honor ever pleased him more.

His useful life ended December 28, 1934, at his home in New Brunswick. His will, filed for probate a few days afterward, reflected his abiding love for pharmacy, for his benefactions were largely to the American Pharmaceutical Association and the New Jersey State Association. His entire scientific library he left to the Philadelphia College of Pharmacy and Science.

William L. Cliffe was born in 1865 and received his early education in the public schools of Philadelphia. His pharmaceutical apprenticeship was served in the store of F. H. Bassett, Frankford. He graduated from the Philadelphia College of Pharmacy in 1884, his thesis subject being "Iris Versicoloris."

In the same year he opened his pharmacy at Kensington Avenue and Somerset Street, in North Philadelphia, and his establishment came to be one of the landmarks of the neighborhood. For over half a century he served his local people and served them well, and his reputation increased with every passing year. Nor did he confine his work and service to a local terrain, for in matters of legislation and education he came to be one of the foremost figures of Pennsylvania Pharmacy.

He was President of the Pennsylvania Pharmaceutical Association in 1901 and was for many years a member of the State Board of Pharmacy.

In College affairs his hand and head were always busy. He was a valuable member of the Board of Trustees since 1908, and Vice-President since 1928.

He passed away at his home in Frankford on February 4, 1935, leaving a host to mourn his death.

Mr. Cliffe was a friendly man, clear thinking and honest to the core—and he had the kind of loyalty that suffers none with time and petty trials.

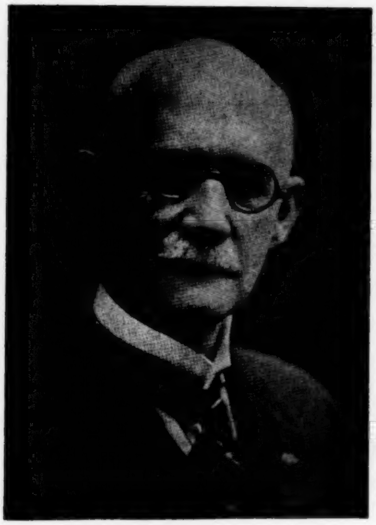
His presence and his work will be sadly missed in the many circles upon which his diversified services touched.

The Badische Anilin-und-Soda Fabrik is said to have spent nearly five million dollars in the search of artificial indigo from coal tar. Indigo (as the name implies) was an Indian crop that in 1900 required a million acres of planting to meet the world's demands—and indigo extract sold at one time for four dollars a pound. But when the Badische chemists solved their problem, traffic in indigo turned from India to Germany, and the price turned upside down—in 1914 reaching a low mark of fifteen cents a pound.

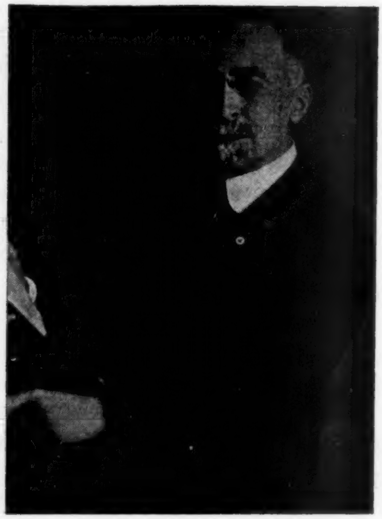
Not even the pauper labor of India and Nature's cheapest bid could compete with the chemist and his colors from the crudes of coal tar.

FOUNDERS' DAY

Guests of Honor



Francis E. Stewart



Warren H. Poley

THE Philadelphia College of Pharmacy and Science each year celebrates "Founders' Day," in honor of those stalwart Quaker apothecaries whose courage and vision so securely established the institution, that it has served and served well through all the long and varied decades of its existence.

And it was able to do this largely because it has been peculiarly fortunate in earning and keeping in its diversified services the interest and assistance of men of high calibre and worth—men much like the men who laid its firm foundations. Two such men are included in the "Honors of Founders' Day," celebrated February 23, 1935. Between them they have labored faithfully in the cause of the College and in the service of their fellow men for nearly six score years—and that is a record that any institution should be glad to remember and to honor.

Warren H. Poley, treasurer of the College from 1916 to 1920, and Dr. Francis E. Stewart, since 1916 a member of its faculty, are the guests of honor at the Founders' Day banquet and it is a mark of respect well deserved.

Warren H. Poley was born in Montgomery County, Pa., and shortly after his birth his parents moved to Norristown, Pa., where he received his early education, graduating from the high school in 1871. In August of that year he entered the drug store of his uncle, Francis B. Poley, and remained in his employ (or his estate) until the fall of 1876.

He graduated from the College in 1875, his thesis being "Phytolacca Decandra." In 1876 he purchased a drug store in Germantown between Upsal and Sharpnack Streets, removing in 1883 to a larger store and dwelling nearby, and known as the Upsal Pharmacy; previously (1881) he had purchased the Walnut Lane Pharmacy, operating both stores with marked success. In 1904 he sold the Upsal Pharmacy, and a year or so later the Walnut Lane Pharmacy.

Warren H. Poley has rendered nearly forty years of splendid service as a retail pharmacist, yet he has never neglected the duties which he felt were due to his profession. He was one of the organizers of the Philadelphia Association of Retail Druggists, and has been its vice-president and president, also a member of its Executive Committee from the time of its organization to his retirement from business when he was elected an honorary member. He was, also, one of the organizers of the National Association of Retail Druggists, and is a member of the American Pharmaceutical Association since 1906.

He has ever exhibited the deepest interest in his Alma Mater. Elected a member of the College in 1900, he became a member of the board of trustees in 1906, and an active member of many of its committees, and treasurer of the College (1916-1920), in which position he rendered services of unusual value. He was elected recording secretary of the Alumni Association of the College in 1912-1913, second vice-president in 1913-1914, first vice-president in 1914-1915, and president in 1915-1916, and to this day he continues to manifest a keen interest in the work of the College, always encouraging every progressive movement undertaken by the institution.

Francis E. Stewart was born in Albion, N. Y., on September 13, 1853, and is a descentant of the Perthshire Stewarts. He was educated at Cortland County Academy, Homer, N. Y., and at Oberlin College, Ohio. He was graduated from the Philadelphia College of Pharmacy in 1876 with the degree of Ph.G., and immediately took up the study of medicine, graduating at Jefferson Medical College in

1879. Later he took post-graduate work at the University of Pennsylvania. Following his graduation in medicine, he prarticed for a time in New York City, where he occupied a number of important positions on medical committees and charity organizations. His specialty has been pharmacology, and the supervision of pharmacal and pharmaco-chemical industries by the Federal Government has been his lifelong ambition.

From 1885 to 1891 he resided in Wilmington, Del., where he occupied a prominent position in the scientific and educational life of the community. From 1891 to 1894 he was connected with sanitarium work at Watkins Glen, N. Y. In 1894 he organized a scientific department for Frederick Stearns & Company, Detroit, Mich. In 1898 he became chairman of the medical board of Merck & Co., and editor of Merck's Archives. He then went to California and assisted in organizing the National Bureau of Medicines, which later developed into the Council on Pharmacy and Chemistry of the American Medical Association.

Following his graduation at the Philadelphia College of Pharmacy, he was, for a time, a quiz master in pharmacy and chemistry for the Alumni Association. He has also occupied teaching positions in Jefferson Medical College and the Woman's Medical College. Later, he became professor of materia medica and botany and physiology in the Medico-Chirurgical College, and was awarded the honorary degree of Phar. D. in that institution in 1914. In 1916 he was made lecturer on pharmacy laws at the Philadelphia College of Pharmacy. He is at present director of the scientific department of the H. K. Mulford Company.

Dr. Stewart is a chairman of important committees in the Pennsylvania Pharmaceutical Association and other scientific bodies. He is a member of many important professional and scientific organizations, and of the Masonic order, and an elder in the Presbyterian Church. He is the author of a quiz compend of pharmacy, and a frequent contributor to pharmaceutical and medical literature. He is historian and a life member of St. Andrew's Society of Philadelphia, has traveled extensively, and numbers among his professional and personal friends many leaders in medicine and pharmacy at home and abroad. His hobby is the study of patents and trade-marks as related to medicine and pharmacy and he is a recognized authority on this subject.

SCIENTIFIC AND TECHNICAL ABSTRACTS

Compiled by Arthur Osol, Ph. D.

Some Examples of Fluorescence Acidimetric and Adscrption Indicators. H. R. Fleck, R. F. G. Holness and A. M. Ward. *Analyst,* **60,** 32 (1935). Volumetric determinations in ultra-violet light have been confined, up to the present, to acidimetric titrations, e. g. with quinine sulphate (Mellet and Bischoff, *Compt. rend.,* **182,** 1616, 1926) or umbelliferone (Robl, *Ber.,* **59B,** 1725, 1926) as indicator. Although the pH values at which the color-changes of these indicators take place are different, the end-points observed, in the titrations of N/10 hydrochloric acid or sulphuric acid with sodium hydroxide agree with the end-point in visual light with phenolphthalein as indicator. The authors also find that magnesium 8-hydroxyquinoline complex can be used as an indicator in a similar way, 3 to 5 drops of a solution of this indicator being used in the titration. In titrating solutions of acids, a change from colorless to golden-yellow takes place at the end-point.

Certain silver nitrate titrations, using adsorption indicators, can be carried out similarly in ultra-violet light. In the titration of chlorides (approx. N/40) with dichlorofluorescein (2 to 4 drops of 0.1 per cent. solution) as indicator, a color change takes place at the end-point from a fluorescent yellow-green to a chocolate-colored suspension in which the fluorescence is extinguished. If the silver nitrate solution is added in a rapid stream, the end-point agrees exactly with that obtained in visual light with this indicator. In the titration of bromides or iodides (N/40 approx.) with eosin (2 cc. of 0.1 per cent. solution) as indicator, the change from a fluorescent golden solution to a non-fluorescent chocolate-colored suspension agrees with the end-point in daylight. In the above titrations the values at which the end-points are reached depend upon the rate of addition of the silver nitrate and the amount of indicator used.

Volumetric Method for Lead. I. Tananaeff. Z. anal. Chem. **99,** 18, (1934). Through *Analyst,* **59,** 845 (1934). The method is

based upon the precipitation of lead chlorofluoride, PbFCl. The precipitant contains 8.400 grams of sodium fluoride and 11.692 grams of sodium chloride per 100 cc. and the chlorine content must be accurately determined. For the determination of lead in bearing-metal, 0.5 to 1.5 grams are dissolved in strong nitric acid, and the liquid is diluted and filtered into a 100 cc. flask. The filtrate is neutralized to methyl orange with strong sodium hydroxide solution, treated with a known excess of the precipitant, and made up to volume. The excess of chlorine is titrated in 25 to 50 cc. of the filtrate with silver nitrate solution after addition of a few drops of fluorescein and starch solutions (Fajans, *Analyst*, **48**, 401, 1923). The error is stated to be 0.2 to 0.4 per cent. The quantity of lead in the solution should be at least 0.1 gram. Only silver and mercurous salts interfere.

Comparison of Ephedrine and Pseudo-Ephedrine. J. B. Cristopherson and M. Broadbent. *Brit. Med. Journ.* **3830**, 978 (1934). Through *Pharm. Journ.* **132**, 639 (1934). Comparative tests of the values of ephedrine and pseudo-ephedrine in the treatment of spasmodic and bronchial asthma and enuresis are recorded in a report to the Therapeutic Trials Committee of the Medical Research Council. Speaking generally, approximately double the dosage of pseudo-ephedrine was required to produce an equivalent physiological effect of a given dose of ephedrine. Asthma patients were treated with doses of ¼ to 2 grains of both alkaloids, and they received doses of sodium iodide, 30 grains, twice daily, at 6 P. M. and at bedtime. More obstinate cases were given sodium iodide 30 grains intravenously once a week. Twelve out of the thirty-seven cases had relief from nocturnal dyspnœa when taking pseudo-ephedrine, ½ grain, regularly at bedtime. Others required 1 to 2 grains according to the severity of their symptoms. Experiments to determine the relative actions in enuresis were made on children whose ages varied from 3 to 13 years, and it was found that of twelve patients eight were controlled by ¼ grain of ephedrine, given at bedtime, but seven of these cases required ½ grain of pseudo-ephedrine to produce a satisfactory result. Pseudo-ephedrine is stated to be non-cumulative in its action and to produce fewer "side effects" than ephedrine in the same or larger doses.

Morphine Manufacture. Anon. *Pharm. Journ.* **132**, 635 (1934). About 150 pounds of the raw opium was first made into a thin paste with about twice its weight of water, and this was poured into boiling milk of lime, consisting of 30 pounds of lime to 300 pounds of water contained in a large tank. The fire was drawn immediately, so that the boiling continued only for a few minutes, and during this time the contents were well stirred with a wooden paddle. The mixture was then filtered through the press into the evaporating vessels. In this process the meconic acid is precipitated as calcium meconate, which collects with other insoluble matter in the press, while the morphine, which is soluble in lime water, passes through in the filtrate. The cake of calcium meconate was thoroughly extracted by passing hot water from a small tank through the press. The filtrate with the wash water was evaporated to about 30 gallons and 15 pounds of solid ammonium chloride was then added, and the whole boiled until the evolution of ammonia ceased. In this reaction the lime is converted into calcium chloride, and the removal of ammonia leaves an almost neutral solution in which morphine is only very slightly soluble. The mixture was then allowed to stand over night for complete precipitation, and the morphine was thus obtained as a greyish-white crystalline sludge. After filtering and washing the crystals were dissolved in the least quantity of hydrochloric acid. The solution so obtained was decolorized with animal charcoal, evaporated to a small bulk, and allowed to crystallize. The crystals were then dried.

Hexylresorcinol as an Anthelmintic. M. A. Tubangui, M. Basaca and A. M. Pasco. *Philippine Journ. Science,* **54**, 473 (1934). Observations were made on the efficiency of hexylresorcinol against different types of human intestinal worms under field conditions in the Philippines. The drug was given in hard gelatin capsules and in the form of sugar-coated pills, adopting the doses recommended by the manufacturers. It was administered early in the morning on an empty stomach and the patients were advised not to take food for at least four hours afterwards. Each patient received only a single treatment. A total of 861 individuals, representing both sexes and all ages from 4 years up, were treated.

Hexylresorcinol was found to suffer in anthelmintic efficiency when placed in gelatin capsules, due most probably to the reaction of the drug with gelatin. The sugar-coated pills, besides being more

efficacious than the gelatin capsules, did not appear to be affected by climatic conditions, as did the capsules. The anthelmintic efficiency of the pills was appreciably increased by a saline purgative twenty-four hours after their administration.

In infestations with ascaris and hookworms the administration of single doses of the pills removed from 82 to 85 per cent. of the former parasite and 74 per cent. of the latter. Of the ascaris cases 53 to 64 per cent. were found negative after the treatment and of the hook-worm cases 25.4 per cent. Observations on a limited number of cases showed that hexylresorcinol is also effective against the human pin-worm but not against the tapeworm.

An Incompatibility of Dimethylaminoantipyrine (Amidopyrine). P. Casparis. *Schweiz. Apoth. Ztg.* **72,** 695 (1934). Through *Squibb Abstract Bulletin,* **8,** A42 (1935). Since a patient returned a prescription containing amidopyrine three times because it became yellow-brown in a few days, the druggist requested the author to investigate the problem. The incompatibility was due to the presence of a gum arabic mucilage that contained some oxydase. The latter in small amounts slowly oxidized the amidopyrine turning it first violet and then yellow and the development of color proceeded parallel to the guaiacum and benzidine reactions with gum arabic. Larger amounts of the oxydase gave a coloration in 20-30 minutes. Heating the mucilage on a water-bath for half an hour produced a mixture that remained colorless. The development of color was independent of light.

Charcoal in Infection. Advocates of charcoal and carbon for the treatment of infections will be glad to hear that Dr. E. St. Jacques, of the Jeanne d'Arc Hospital, Montreal, reports in the *Canadian Medical Association Journal* that intravenous injections of animal charcoal clear up a great many types of infections. Using a 2 per cent. suspension of charcoal, with a dosage of 3 to 5 cc. every two days, as many as eight injections have been given without untoward results. The doctor finds it effective in salpingitis, puerperal infection, pulmonary infection, cholecystitis, pyronephyrosis, rheumatic fever, and

furunculosis. In the last named infection, Dr. St. Jacques says that charcoal "reigns supreme." How the charcoal effects a cure "remains a biological secret."—*Drug and Cosmetic Industry,* 35, 549 (1934).

Sterilization Notes. The following formulæ for injections, with directions for sterilization, are proposed for inclusion in the official formulary of the Chilean Association of Chemistry and Pharmacy, and were published in No. 20, page 16, of the official journal of that body.

Inject. Adrenalinæ Chlorhydratus

Adrenalin	1.0 Gm.
Benzoic Acid	0.3 Gm.
Hydrochloric Acid N/10	90.0 cc.
Sodium Chloride	8.0 Gm.
Recently Distilled Water, to	1000.0 cc.

The adrenalin is placed in a flask, and to it is added the hydrochloric acid. In another flask the sodium chloride and benzoic acid are dissolved in 900 cc. of water; this solution is added to the solution of adrenalin, and the whole made up to 1000 cc. The solution is sterilized by tyndallization at 70 degrees for one hour on three successive days. The solution must be colorless, or at most only pale pink.

Inject. Chinini Iodobismutatis

A suspension of iodobismuthate of quinine.

Quinine Iodobismuthate	10.0 Gm.
Guaiacolated Oil, 5 per cent., to	100.0 cc.

In a sterilized mortar the iodobismuthate is rubbed down with the aid of a little oil until perfect homogeneity is attained, more oil being gradually added to render the mixture fluid enough to be poured into a flask where it is made up to 100 cc. According to the exigencies of climate, 5 Gm. of anhydrous lanolin may be added. An aseptic preparation.

Inject. Camphoræ Oleosum

Camphor	20.0 Gm.
Olive Oil, neutralized, to	100.00 cc.

The camphor is put into a 100 cc. flask; 80 cc. of olive oil, heated to between 50-60 degrees, are added, and the whole shaken until solution is effected. When cold it is made up to 100 cc., filtered and sterilized in a closed container at 115 degrees for fifteen minutes.

Inject. Coffeini Compositum

Caffeine	20.0 Gm.
Sodium Benzoate	28.0 Gm.
Recently Distilled Water, to	100.0 cc.

The caffeine and the sodium benzoate are placed in a beaker and 50 cc. of boiling distilled water added gradually. When the salts are dissolved and the liquid is cold, it is transferred to a graduated flask, made up to 100 cc., filtered and sterilized at 115 degrees for fifteen minutes.

Inject. Emetini Hydrochloridi

Emetine Hydrochloride	4.0 Gm.
Sodium Chloride	0.58 Gm.
Recently Distilled Water, to	100.0 cc.

The salts are dissolved in a graduated flask in a sufficient quantity of water. The volume is adjusted to 100 cc., the solution filtered and sterilized at 100 degrees for thirty minutes.—*Pharm. Journ.* 134, 58, 1935.

SOLID EXTRACTS

By Ivor Griffith, Ph. M., Sc. D.

The poetic Berman, whose excellent and picturesque book on the glands is well worth reading, blames the pituitary gland for being the laboratory whose flasks and crucibles turn out that all-important human emotion called love. He dares to give Love a chemical formula. So many O's, so many C's, so many N's, but no I's (for Love was always blind). All through the animal world, says he, in the springtime, when the sleeping pituitary reopens its plants and increases its products in the blood stream, emotions of love are provoked, and all the world goes wooing. When the nightingale warbles and the mockingbird gurgles, when the robin fills its scarlet breast and the starling floats in ecstasy through the perfume-laden air, all are calling for their mates, and all because of love—pituitary extract in the blood —manufactured unconsciously by a few hidden cells. The calf-like characters of love have long been known, but the chemistry of its toxins is still a pretty hypothesis!

Normal blood contains about 5,000,000 red corpuscles in each cubic millimeter, which means that the entire blood contains some twenty-five trillion red cells (and thirty billion white cells), figures that have an astronomical aspect! If mental pictures of the billions and trillions of blood cells crowding, jostling, and possibly struggling like pigs at their troughs for a share of the mere teaspoonful of sugar in the total blood volume of a full-sized man, or the homeopathic super dilution representing the adrenalin trigger-touch to which animal tissues respond, appeal to one's sense of humor, they also do much more than this: They bring home the delicacy of the adjustment by which the human body mechanism is regulated; the extent to which this fine adjustment may be disturbed by seemingly trivial factors; the obligation of both laymen and physicians not to ignore the "slight" tokens of distress of the body engine. And the regard which we must all have for the Infinite Mind, whose eye is on the sparrow and who also watches us.

William Shanks, of Durham, England, was a poet of note—and a mathematician too! It is said that he took the ratio of the circumference of a given circle to its diameter (commonly known as pi) and tabulated this ratio to 707 decimal places.

He was so worried that he did not sleep soundly for ten years in the fear that perhaps he had made a mistake in his calculations. At the end of this time he decided to clear his conscience by checking his figures, and surely enough, he had made a mistake. He corrected himself, and today "stands approved as corrected."

And this is how the pi-eyed poet remembered this thirteen decimaled figure:

"How^{3} I^{1} wish^{4} I^{1} could^{5} remember^{8}
Of^{2} circle^{6} round^{5},
The^{3} exact^{5} relation^{8}
Arkimedes^{9} crowned^{7}."

The number of letters in each word give pi (π) to the thirteenth decimal place (3.1415826535897)!

The news has leaked out, accidentally or wilfully, that German army chemists have developed a new war gas of a degree of toxicity hitherto considered impossible and capable of wiping out communities at a time. Whether this is true or not, it is a certainty that gas warfare will be the outstanding agency of destruction in our next important war. Toward the end of the great World War gas dispersion had been developed with fiendish ingenuity. For instance, there was the German trick of firing gas shells which gave off voluminous smoke or a vile stench which did little harm, but by the time their opponents were used to them and grew careless with their gas masks, the same type of shells would be fired over, but containing in addition some extremely toxic gas.

Most of the so-called nicotine-free tobacco sold in America is chemically or physically de-nicotinized. Actually only about one-half of the nicotine is removed. In Germany, however, they are growing *a nicotine-free tobacco. Its cultivation is so far advanced that there*

is now ready for marketing widely different sorts of nicotine-free cigar, pipe and cigarette tobacco. I have this on the authority of Dr. Paul Koenig, Director of the Institute for Tobacco Research, Forchheim-Karlsruhe. Another announcement from this institute calls attention to the presence in tobacco of large amounts (2-5 per cent.) of cholorogenic acid, a hitherto undiscovered substance which plays a large part in regulating the natural flavor of tobacco.

By the way, note this naïve way of "kidding the public" in reporting the nicotine content of a well-known nicotine-free American cigar: "Nicotine—less than $^{70}/_{1000}$ *of 1%," which seems so much less than* $^{7}/_{10}$ *of 1%.*

What time is it—as you now read this paragraph?
What day, of what month, of what year is it?

Your answer is all wrong!—for according to the most recent studies into the chronology of Christ, based upon recorded history and astronomical studies, which fix the identity of the Star of Bethlehem as Saturn, the birth is definitely dated between October 10th and December 15th of the year 7 B. C. Thus our calendar is based upon an absolutely wrong premise—which, however, postpones neither the rent day nor pay day.

Support for the old adage, "We dig our graves with our teeth," has been found in experiments by Lester Ingles, graduate student at Brown University. Working under the direction of Prof. A. M. Banta, Mr. Ingles found that jars of the little aquatic animal Daphnia (used so successfully by Dr. Viehoever in drug assays) given short supplies of food lived on the average 50 per cent. longer than did similar colonies kept well fed. Dr. Banta's explanation was that these animals, thus forced into abstemiousness, burned their life-fires lower, produced and used less energy, and consequently did not "wear out" so soon. "Consider the lily"—yes! but give the daphnia too a bit of thought!

Among the first to proclaim the virtues of the antiseptic substances found in coal tar was George Berkeley, Bishop of Cloyne, Ireland, who died in 1753. His prophetic slogan, "Westward the course of Empire takes its way," has become a household expression. California honored him by calling the university city of that State by his name. He extolled tar water as a panacea for many ills, and this, together with his then unpopular philosophy, brought ridicule upon him. Pope, the great English poet, however, came to his defense and in one poem says:

> "Truth's sacred fort the exploded laugh shall win,
> And coxcombs vanquish Berkeley with a grin."

The Givaudanian, *an aromatic sheet-to-the-wind, publishes the results of an odorometric survey. Of three hundred and fifty participants, all of the speaker sex, over three hundred agreed that of all industrial product smells, the smell of glue was the most offensive. Sticking close to glue in nose-dislike, paraded in the order named, ammonia, kerosene, carbolic acid, dyed fur, rain slickers, moth balls, and dry cleaning fluids.*

The smell of new shoes and of new woolen suits was pronounced obnoxious by some. Our recollection of the smell of new clothes is much too remote to lay any dependence upon it.